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ORIGINAL ARTICLES

A STUDY OF THIRD MOLAR IMPACTION ASSOCIATED WITH ORTHODONTIC RETENTION*

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O RTHODONTIA is the science of the prevention and treatment of dental malposition and the allied abnormalities which they cause, aggravate or modify.

Retention.—Retention is the mechanical or functional means employed to maintain the approximate functional equilibrium of dental and allied structures obtained by orthodontic treatment. Retention should permit function to the utmost degree and limit it only where necessary to resist retrograde tendency to the prior or impending abnormality.

Impaction.—Impaction is the forcible collision of abnormally erupting or erupted teeth with over-resistive tissues or with other teeth.

Dental impaction is therefore a condition of abnormal dentition which is first clearly evident in the difficult teething of the infant, then persists in greater or lesser degree through adolescence into maturity. It terminates in third molar impaction with accompanying or resultant disturbances of nervous and structural character and in varying degrees. Orthodontia is therefore a treatment of impaction. Dental impaction by the abnormal direction and amount of stress it produces, alters function and anatomy and interferes with that normal developmental tendency which should follow normal function. Development does not follow function primarily. Development permits of function which in turn aids in subsequent development.

Third molar impaction and its influence on orthodontic retention must be studied broadly and scientifically with due regard being given to the

*Read before the meeting of the American Society of Orthodontists, Chicago, Ill., April, 1922.

nature of the deformity preceding it, the character of the treatment and retention applied, the result obtained together with the time required for that treatment, age of patient, health-habits, cooperation of patient, resistance of tissues, caries of teeth, size, number and time of eruption of the teeth. The condition of the nervous system should be given special consideration in this relation.

Orthodontic treatment is to a very great extent the expansion of the dental arches. These arches require expansion because the bony structures which support the teeth did not develop to their normal size at the normal age to permit the normal eruption of the normal number of teeth at their normal eruptive time.

Dental arches seem to complete their width development prior to the seventh year (approximate). The vertical and anteroposterior developments are not completed until maturity when the third molars are normally in occlusion.

Orthodontic treatment inclusive of retention, then, cannot be considered complete and the responsibility of the orthodontist is not relieved until the third molars are erupted and occluded, or until definite evidence shows clearly that proper provision is made for the eruption of the third molars, or until all impactive factors are nullified or eliminated.

Orthodontia is a corrective and preventive treatment applied during development. It is always more or less of a compromise although often seemingly perfect results are attained by good orthodontia.

Development begins in the fetus and proceeds to maturity. Malnutrition and maldevelopment start in the fetus and affect the infant during several years of development before any orthodontic treatment can be started. The infant is subjected to many diseases which unquestionably leave their mark in the bony and allied structures. The period of development of parts of the maxillary structure passes and that development which should have been made is only partially completed. The teeth, developed to their full diameters, attempt to erupt into a too small arch and impact and erupt generally too far posterior. (The roots and apices indicate the real tooth positions more than the crowns.) If no orthodontic treatment is given and no teeth are lost, permanent teeth may impact and later posterior teeth may erupt by unduly forcing the side teeth ahead of them, by impaction to greatly crowd and distort the incisor and cuspid teeth. Decay, missing and extracted teeth, and sucking habits merely alter the form of the deformity caused by the prior maldevelopment causes.

Mechanical or functional orthodontic treatment, instituted as early as two and a half years to five years and up, starts as it were, on a stern chase—with a handicap of several years at best. If the treatment then given uses a few posterior teeth, arbitrarily assumed to offer a stable anchorage, to expand the anterior part of the dental arches, there must result a posterior movement of the anchor teeth—first, because of that law of Newton, "Action and reaction are equal and opposite in direction," second, "because the anchor teeth are just anterior to an undeveloped and developing region which

has little resistance to a posterior pressure and was not designed to receive such a pressure." Even though there were no posterior movement of anchor teeth and the teeth remained anchored, most arches would still remain too far posterior as is evidenced by the commonness of third molar impaction and deficient development of the lower half of the face in our civilization, even where no orthodontic treatment has been given.

When expansion is obtained by massing the teeth of the right side against those of the left, there is greater opportunity for really expanding the fundamental bone and thereby providing more tongue room, better muscle placement and stress, and room for crowded teeth without taking that space from teeth farther posterior. Even with this rational expansion, it is too often still impossible to move all the teeth far enough forward to relieve impaction of the third molars or even the second molars in many cases.

Continuous practice in the same city for twenty-three years with no effort or opportunity or desire to evade any failures of treatment has provided for the careful conscientious observation of many cases years after final treatment and retention. It has been my lot to observe many successes and failures following various kinds of treatment. The successes followed the best approximation of the natural or normal. The failures followed the ignoring or belittling of third molar impactive pressure, or the impossibility of imitating the normal.

Cases have been under close observation, treatment, and retention for seven to fifteen years, and in some instances opportunity has been had to see and cast results fourteen to fifteen years after all retention had been removed. The results have not been always just what one might like to see, but from the time of 1906 when impactive pressures began to be clearly realized by the writer, the results have been uniformly good, providing third molar space was provided or assured, or their impactive pressure eliminated.

I have from time to time warned of third molar pressures and have advocated a scientific calculation of dental arches in order that (1) movements indicated might be made with appliances which obeyed the laws of physics, and (2) that the operator might *know* what he was doing—so that if he then failed to obtain the result desired, he might *intelligently* apply the compromise treatment *knowing then* that it was the only solution under the conditions.

As expressed by the writer at Washington in November, 1908, "The problem today in orthodontia is *not retention*, but still *how best to treat so as to obtain approximately normal results*, or *how or when to compromise* after an intelligent effort to obtain that normal."

Studies of cases from practice with casts before and after, and years after with radiograms and photographs where possible, are here submitted that the facts may show success and failure, and possibly indicate some compromise treatment.

All retention will be observed to be of light or flexible type, that is, never massive or rigidly holding many teeth together. The bands, bars and

spurs prevent return to former positions and at the same time permit fullest possible function and cusp retention. The main idea is to permit the greatest possible development posterior to and beneath and around the area of orthodontic treatment.

Expansion appliances will be observed to be root and bone moving types with multiple tube control. The vertical end arches being locked by bent ends, notched ends, band locks, and arch extension locks, the three former being mainly used because the arches were formerly made of German silver. The soldered extension locks were soft soldered to maintain the wonderful spring quality of German silver. The noble metal spring wires of the period of 1908 and before did not even approach the spring quality of German silver although the writer indicated the possible use of the noble metal

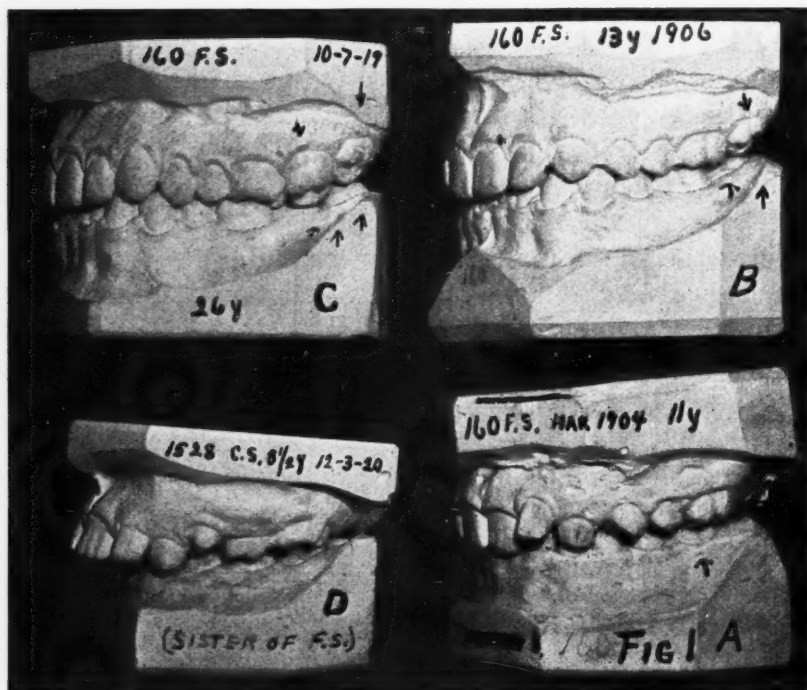


Fig. 1.

arch locks and extensions in 1908 at Washington, at the meeting of the American Society of Orthodontists, but stated a preference for the quality of the German silver arch. The clinic at that meeting covering these points was not published, but the illustrations and casts and appliances are still kept as records. All appliances are now of noble metals.

All cases shown have been expanded to a limit calculated from measurements of the teeth in the case.

No posterior pressure has ever been used unless the case seemed to call for such treatment, which is rarely primarily indicated, until lateral root and bone expansion is first tried. Then anteroposterior pressures have been resorted to as a compromise and with the definite conviction that such necessary compromise was at the most probable expense of third molar position and would or might aggravate or cause a subsequent third molar impaction

with any of the accompanying sequelæ. One of the objects of this study is to show that *retention where apparently inactive or static, in reality produces a definite restraining force against the eruption of second, but most generally third, molars.*

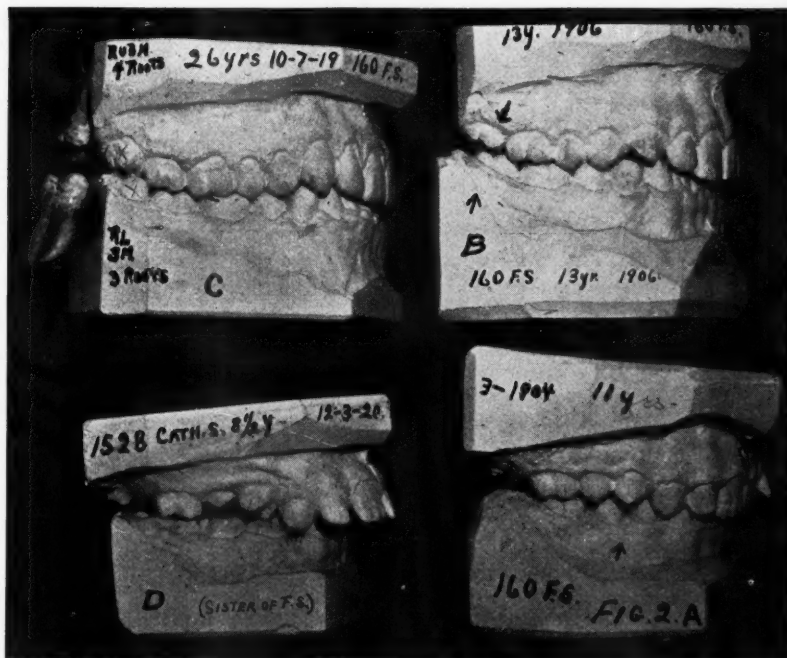


Fig. 2.

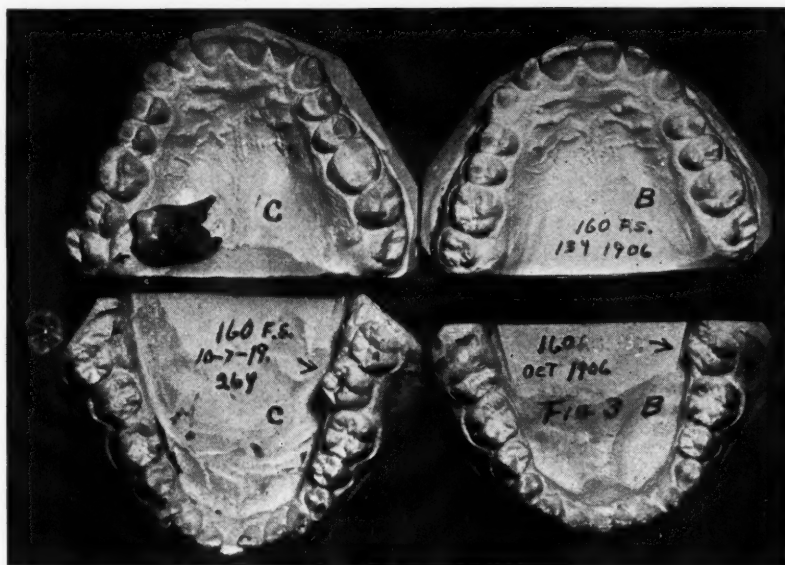


Fig. 3.

REPORT OF CASES

CASE No. 160.—Female. (Figs. 1, 2 and 3.*) Start March, 1904. Age 11 years. Treatment ended including retention October, 1906, at which time possible third molar impaction

*On account of the great number of pictures in this article, the publishers have omitted the following: Figs. 5, 14, 39, 45, 47, 50, 51, 52, 53, 60, 61, 62 and 63.

was predicted as a possibility posterior to left lower second molar which erupted tipped lingually. Patient was a frail, nervous girl with spinal curvature and was very particular about what she would eat.

Treatments including retention—83; 64 in 1904; 17 in 1905; 2 in 1906. Apparatus



Fig. 4.

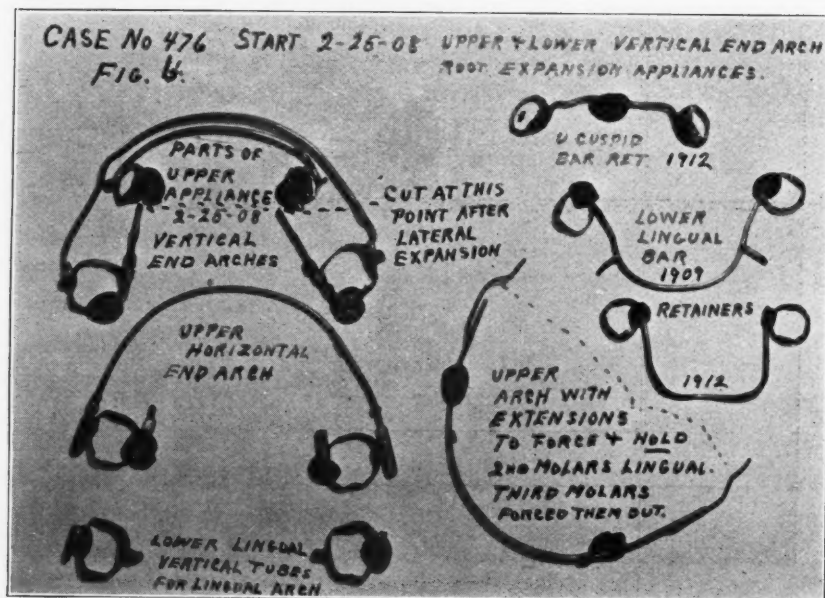


Fig. 6.

was horizontal arch type with intermaxillary pressure to force lower teeth forward to harmonize with uppers. Bite plane plate used to aid treatment and as final retention after lingual lower molar bar retainers were removed. Patient was anemic and therefore light pressures and frequent adjustments were given.

When the left lower second molar erupted lingually (Fig. 3-B) further treatment was advised but patient and parents said they were fully satisfied even though warned of possible third molar impaction to follow. Note overbite of incisors and cuspids and posterior occlusion of lower incisors and cuspids. Also note lingual occlusion of left lower bicuspid



Fig. 7.

and molars (Figs. 1 A, B, and C). Note Fig. 1-C at twenty-six years when patient returned with her little sister eight and one-half years old whose cast is shown in Fig. 1-D, same type of deformity. Third molar and other impaction, as predicted in 1906, shown in Fig. 1-C.

Figs. 2-A, B, C, D right views. Fig. 2-C showing right third molars extracted to relieve serious irritation.

Figs. 3-B and C occlusal views also four rooted third molar. Left upper first molar devitalized and imperfectly filled. Note crowded lower incisors and impacted molars.

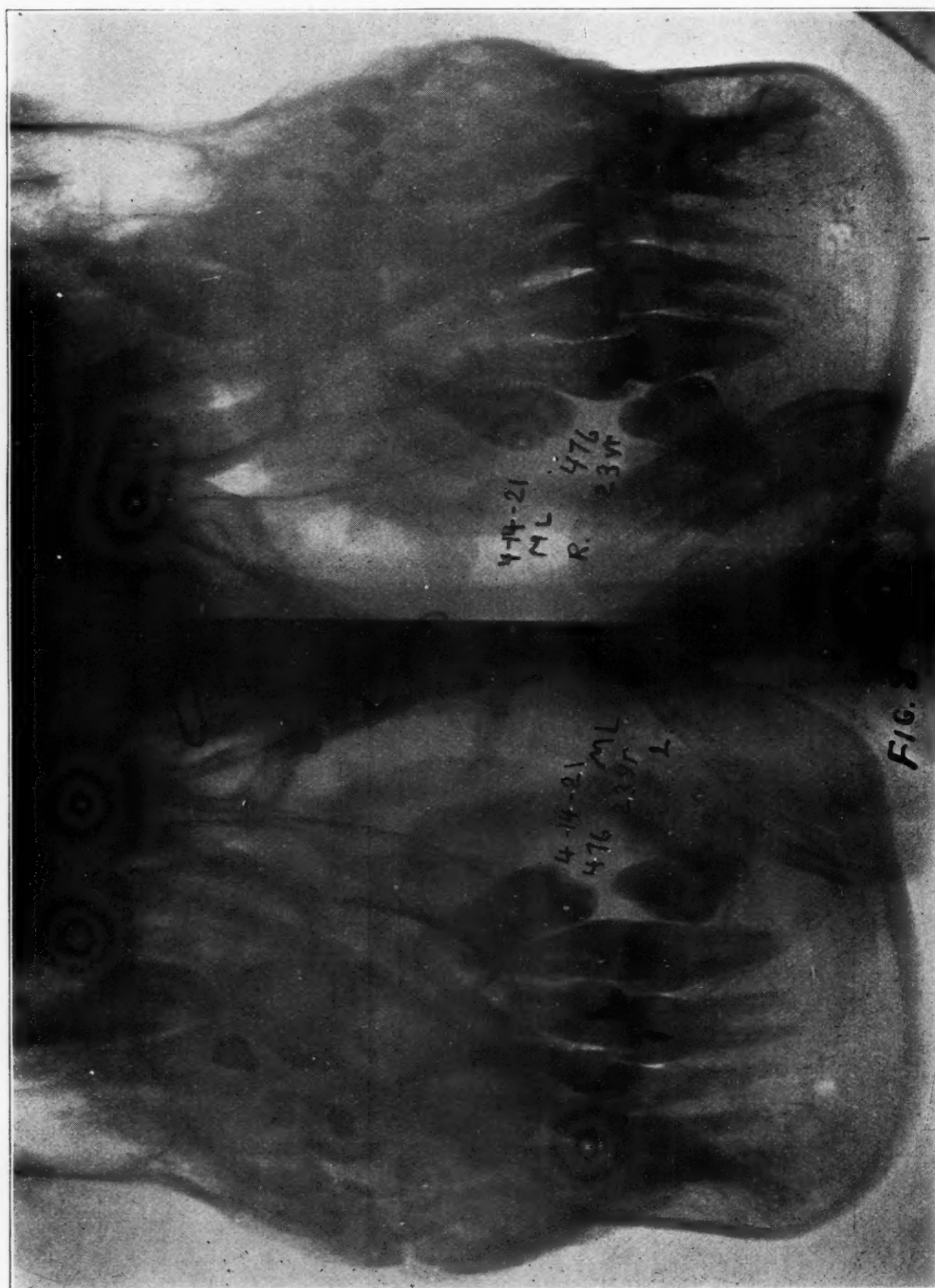


Fig. 8.

Patient stated that she had considerable trouble when third molars erupted—headache, earache, a sense of pressure, and soreness on left side.

The overbite and shortness of the arches interferes with speech in this case and the tongue is indented with the lingual surfaces of the teeth. The same overbite evidently

constitutes a functional retention which has prevented a forcing forward of the teeth anterior to third molars and has undoubtedly aggravated the impaction.

The crowding and excess mesio-distal contact pressures of all teeth in this case indicates that the patient must have passed through and still endures irritations which she should not be expected to endure and enjoy good health.

CASE No. 476.—Female. Start February 25, 1908, 9 yr. 11 mo. Upper and lower vertical end arches in multiple tubes for root expansion. No posterior pressures applied until lateral expansion complete, then horizontal end arches with intermaxillary force to harmonize. Great resistance encountered. Upper teeth finally moved back to meet what could be attained in the lower. Persistent effort over eight years failed to give desired results—bone being peculiarly hard. Patient nervous type with high malar bones and narrow lower third of face.

Fig. 4. Note that occlusion is not good and the bite indicating plane of occlusion is warped. Teeth are peculiarly marked in shape and color. Third molars not erupted at

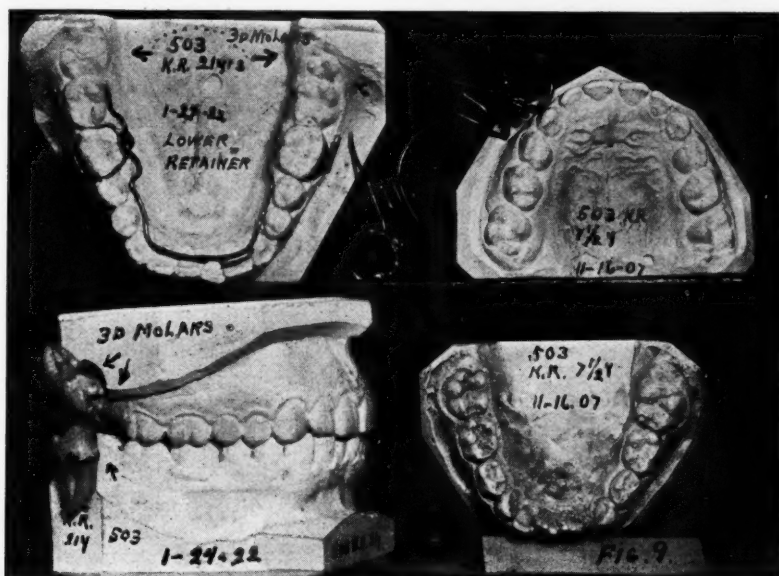


Fig. 9.

23 years, all teeth jammed tightly together and evidently moving under the stress associated with third molar attempted eruption.

Fig. 6. Appliances used in treatment. Note lingual bars from cuspids to molars which were cut after lateral expansion. Simple retention.

Fig. 7. Radiograms at 18 years. Apparently good space between roots except that second molars tip posteriorly and third molars are impacting. Advised extraction of

TABLE I.—CASE 476

	YEAR	TREATMENTS	HR.	MIN.	BRO. APPOINTMENTS
1st	1908	30	11	15	—
2d	1909	23	4	27	1
3d	1910	33	7	58	3
4th	1911	29	14	58	7
5th	1912	17	9	04	2
6th	1913	19	9	08	5
7th	1914	22	9	12	3
8th	1915	13	4	18	7
9th	1916	3	1	18	—
10th	1917	2	—	26	—
11th	1921	1	—	30	—
		192	72	34	28

third molars but patient being in college and not sensing any definite irritation other than headache and seeming eyestrain put the matter aside.

Fig. 8. Radiograms at 23 years. Impaction definite, no marked or particularly noticeable irritations but the occlusion has become worse. In this mouth there is almost no decay, except in molar pits. Nervous system must be stronger than average to resist

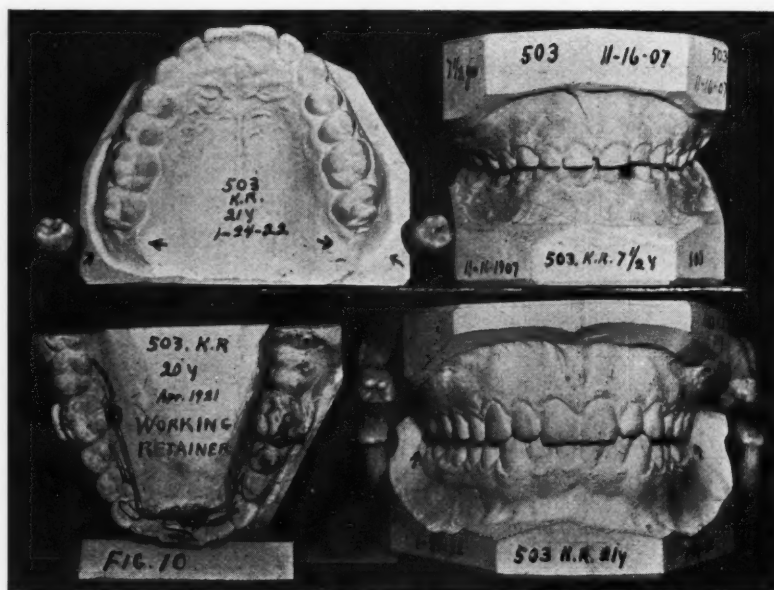


Fig. 10.

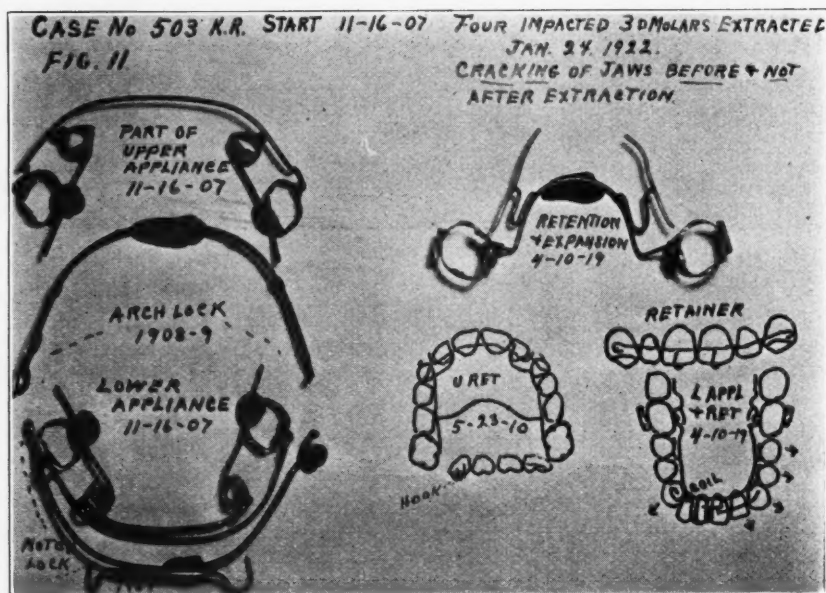


Fig. 11.

the impaction stress. The years of treatment and retention are far too great. Some extraction might have saved the occlusion and would have been a lesser evil.

The time record of treatment and retention is shown in Table I.

CASE No. 503.—Female. Patient out of Cleveland 70 miles. Start Nov. 16, 1907, at seven and one-half years. Upper and lower multiple tube labial and buccal vertical tube root and bone expansion appliances for lateral expansion. Arch ends bent or notched to lock. (Fig. 11.) Teeth of one side massed against those of other side that the expansion

might be actual and not at expense of space belonging to posterior teeth yet to erupt. At the completion of lateral expansion, as the permanent incisors erupted they were guided and worked forward before the alveolar bone formed thus making practically no posterior

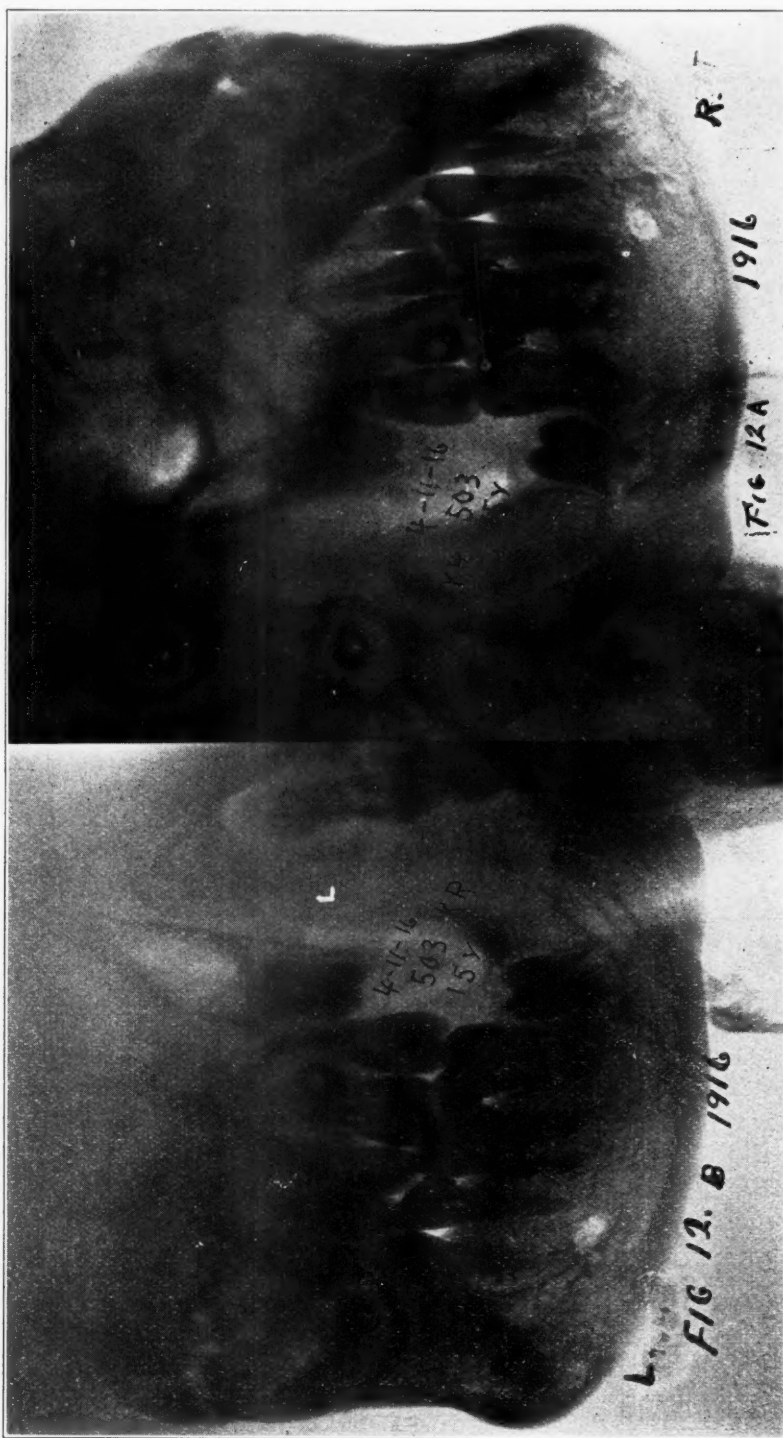


Fig. 12.

stress. May 23, 1910, upper cuspid and molar band anchorage lingual bar retainer maintained lateral expansion and held incisors forward to permit eruption of cuspids anterior to first temporary molars. (Fig. 11.) June 10, 1910, lower retainer lingual bar on molar

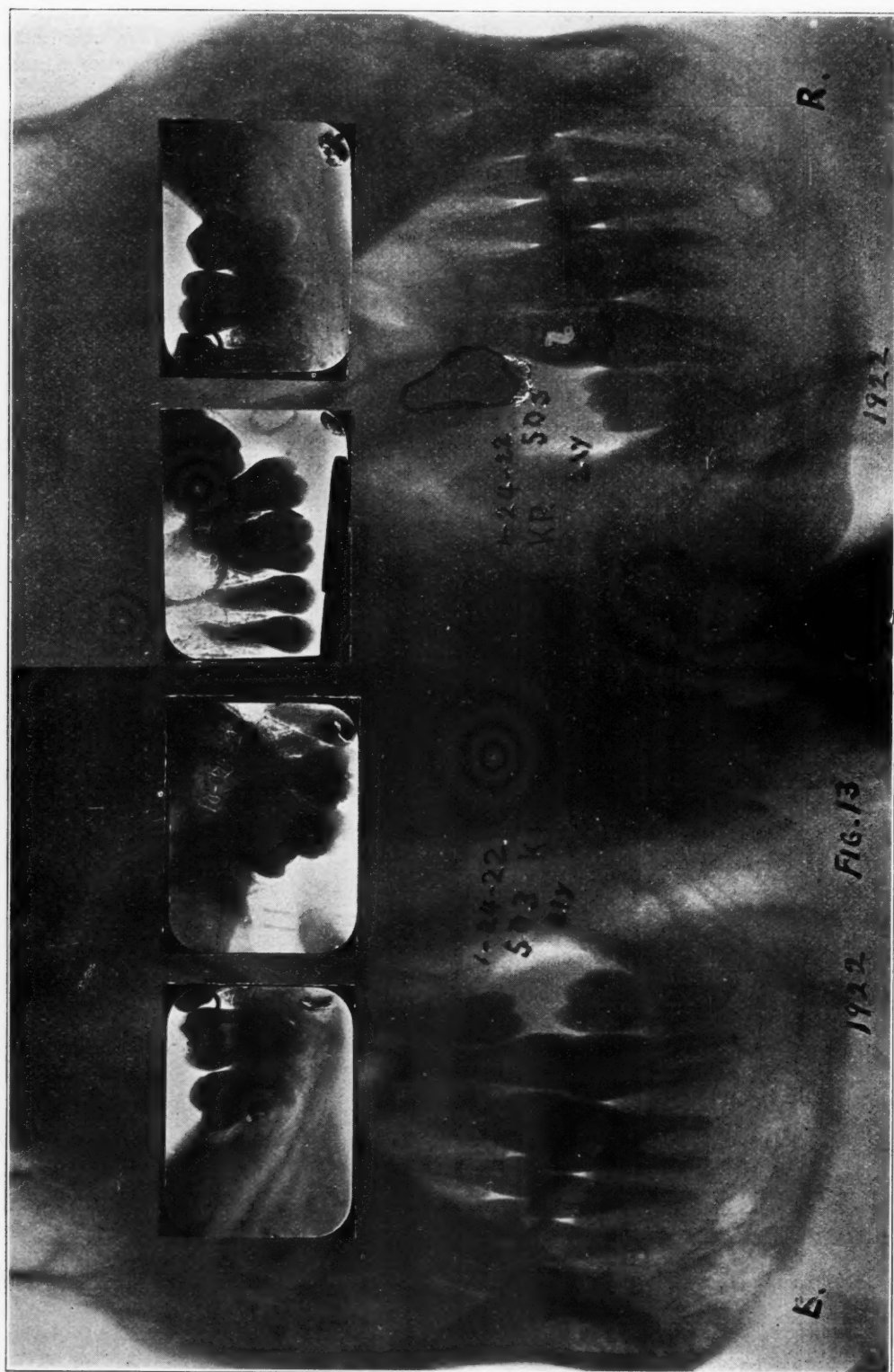


Fig. 13.

anchorage held lower teeth forward and lateral so lower cuspids could erupt anterior to temporary molars. As the lower teeth were about $\frac{1}{16}$ inch posterior, intermaxillary rubbers were used from hooks on upper cuspids to rear of tubes on buccal of lower molars. When

lower cuspids erupted they required rotation as did the bicuspids and horizontal end arches with bands and ligatures were used. Second retainers were fitted May and June, 1915, removed in April, 1916, and refitted with extension springs for left lower second molar, working from lingual arch to tip molar buccal. Note that all erupting teeth though small seemed to come in rotation and apparently through great resistance. December 30, 1917, all appliances were removed and case appeared finished as large radiograms taken April, 1916, showed all four third molars apparently coming normally with plenty of room for eruption.

April 10, 1919, upper and lower lingual expansion appliances were again fitted as the arches contracted—particularly the lower. The 1916 radiograms of third molars *apparently* cleared them of undue pressure. The patient also developed tumefaction of sub-maxillary, parotid and thyroid glands which later yielded to KI and Colorado climate treatment. From this time on the patient was in for treatment at infrequent intervals as she was at school in the east where other orthodontists aided treatment and helped maintain prophylaxis.

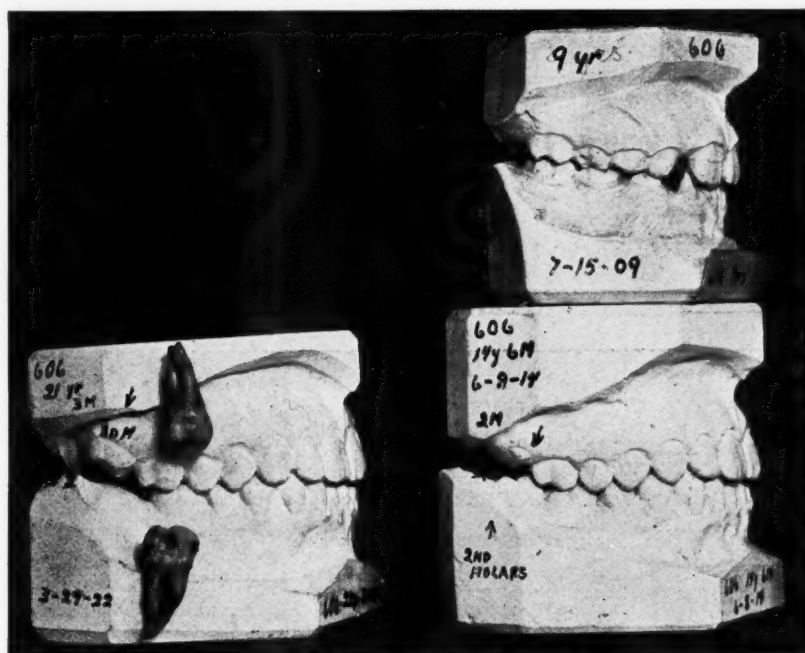


Fig. 15.

TABLE II—CASE 503

	YEAR	TREATMENTS	HR.	MIN.	BRO. APPOINTMENTS
1st	1908	13	10	00	—
2d	1909	14	9	26	—
3d	1910	10	9	43	—
4th	1911	9	4	41	1
5th	1912	8	7	50	—
6th	1913	9	5	16	1
7th	1914	8	5	51	2
8th	1915	11	6	01	—
9th	1916	8	4	55	—
10th	1917	2	—	40	—
11th	1918	1	—	12	—
12th	1919	11	10	43	—
13th	1920	3	1	21	—
14th	1921	7	3	24	—
15th	1922	1	—	53	—
		115	80	56	4

October 27, 1921. The patient complained of gum soreness over and in rear of erupting third molars. She had previously had right earache and throat irritation attributed to the glands. Large head radiograms Jan. 24, 1922, showed the third molars impacting—the lowers tipped posteriorly and markedly curved roots, the uppers impacted against the seconds and the right tipped decidedly forward and jammed with crown above distal con-

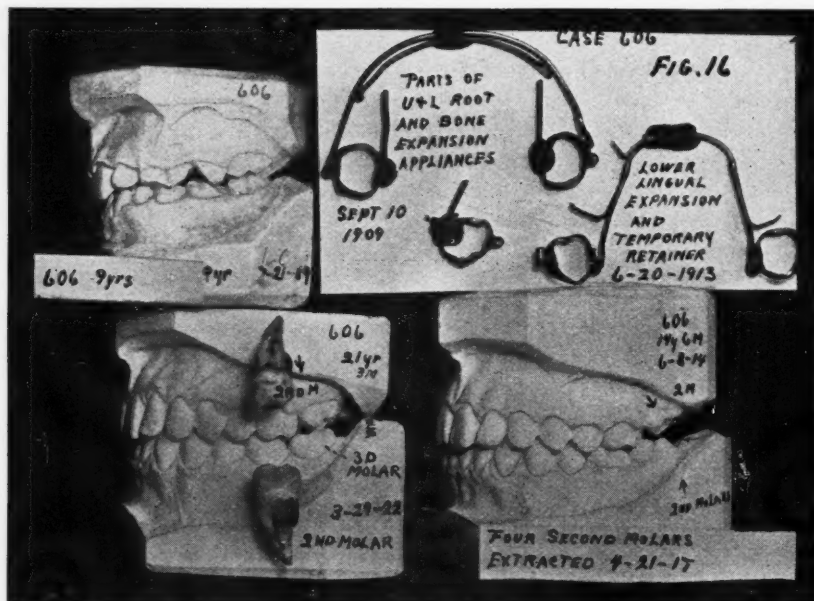


FIG. 16.

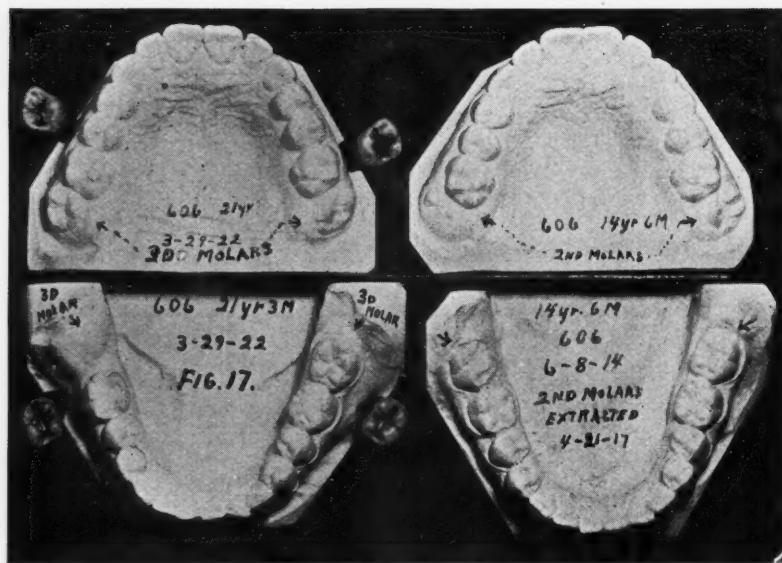


Fig. 17.

vexity of upper second molar crown. All retention was removed and the third molars extracted. The right upper third molar being removed with great difficulty and right earache and right eye vision blurred following extraction.

Illustrations show 1916 and 1922 radiograms, casts at 7½ and 21 years, the extracted teeth, expansion and retention appliances. (Figs. 9, 10, 11, 12, 13.) A summary of the case time record is given in Table II, all of which is good evidence that the orthodontist's responsibility is not relieved until the third molar is in or its pressure factor eliminated.

CASE No. 606.—(Figs. 15, 16, 17, 18 and 19.) Start Sept. 10, 1909. Upper and lower vertical end root and bone expansion appliances. Age nine years. Female. Nervous. July 16, 1910, upper coronal theoretical arch charted and expansion completed to that



FIG. 18.

limit. Intermaxillary pressure to lower molars. June 20, 1913, lower lingual vertical retainer and expansion appliance fitted. It had band locks and extensions to work on bicuspid and left cuspid. July 16, 1913 upper bite plane retainer fitted and worn

about two years. July 8, 1914, casts taken showing late eruption of second molars and their crowding outside the arch in the upper. April, 1917, extraoral jaw plates showed impacted molars. April 21, 1917, the four second molars were extracted to relieve the impaction and resultant highly nervous condition of patient who was then 16 years, 10 months old. The age of patient, the extreme nervousness and the certainty that the bone could not grow fast enough to relieve the impaction made this decision necessary. Other treatment could not relieve and any extractions anterior to the impaction field (bicuspid for instance) would have been too far from the area in which immediate relief was necessary. Bicuspid extraction here would have aggravated the overbite condition and prolonged treatment and retention must have followed. Third molar extraction seemed out of the question and it would not have relieved the second molar impaction as they were forced outside the arch and their roots were jammed together and curved. This extraction seemed to be the lesser evil and the third molars were allowed to erupt without additional stress and had a good chance to develop as far better teeth. The second molars had occlusal fillings and mesial cavities. The patient was relieved immediately after the extractions and has been markedly less nervous and less irritable since that time. The reasons for the extraction was explained to patient's father, a dentist, and to the extractor who agreed

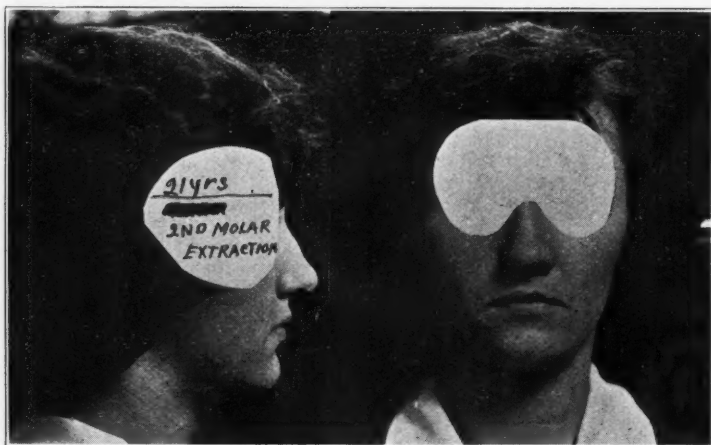


Fig. 19.

that this treatment, in this case, was a lesser evil than any other treatment that could be suggested.

Fig. 15. Right of case at 9 years, $14\frac{1}{2}$ years and at $21\frac{1}{4}$ years in which the extracted second molars show pinched roots and buccal disintegration. Right lower third molar still not erupted. In this and all cast illustrations to follow note that there is barely room for eruption of third molars even after seconds are extracted.

Fig. 16. Left of same casts, and molars also parts of the appliances and retention used.

Fig. 17. Occlusal at $14\frac{1}{2}$ and $21\frac{1}{4}$ years. Note second molars (upper) crowding outside arch and third molars (after second molar extraction) also still crowded. It does

TABLE III.—CASE 606

	YEAR	TREATMENTS	HR.	MIN.	BRO. APPOINTMENTS
1st	1909	6	4	21	—
2d	1910	25	11	02	4
3d	1911	35	15	03	1
4th	1912	32	12	26	2
5th	1913	31	13	01	2
6th	1914	4	1	13	1
7th	1916	1		24	—
8th	1917	2		22	—
		136	57	52	10

not seem possible that any other solution of this problem could have been made or have given relief so well.

Fig. 18. Radiogram at 16 years, 10 months. Observe proximity of third molar to inferior dental canal—the crowding of second and third molars and in the upper the convergence of molar roots. The extraction here gave relief at the center of pressure and



Fig. 20.

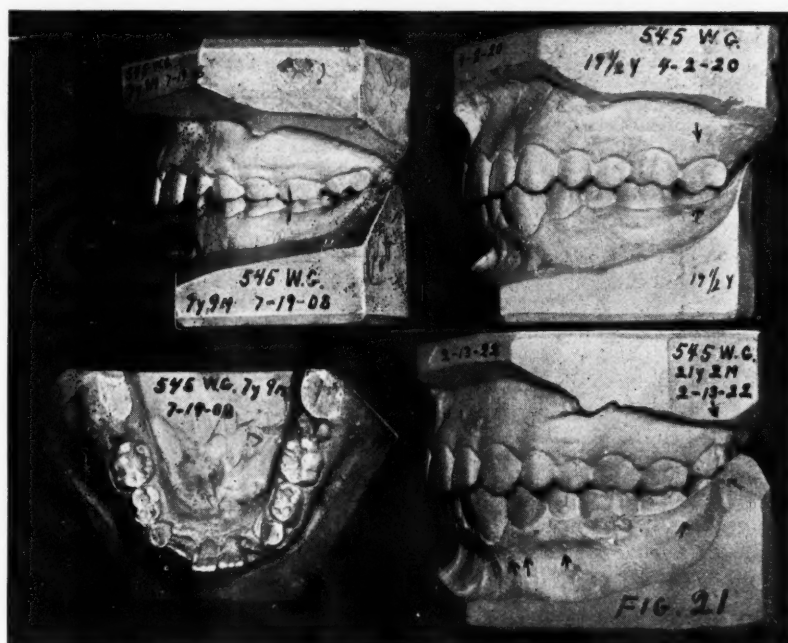


Fig. 21.

relieved in two directions—posterior and anterior as well as above and below.

Fig. 19. Photos at 21 1/4 years. The results seem good but close observation confirms our belief that the full number of teeth, all farther forward, and a wider arch would have filled this face out to an ideal. Drs. I. B. Davenport and E. A. Bogue were right in that

contention—but it is not always possible or expedient to struggle indefinitely for that ideal. In this case it was not possible. Summary of treatments is shown in Table III.

CASE No. 545.—Start Sept. 19, 1908. Age 7 $\frac{3}{4}$ years. Male. Upper and lower vertical end labial and buccal arch expansion appliances to make one side move the other without posterior pressure. Lateral expansion to Bonwill calculated arch—later corrected to writers arch calculated from incisors as published elsewhere. Later compared with arch determination by writer as calculated from all the teeth and found to agree. Patient one



Fig. 22.

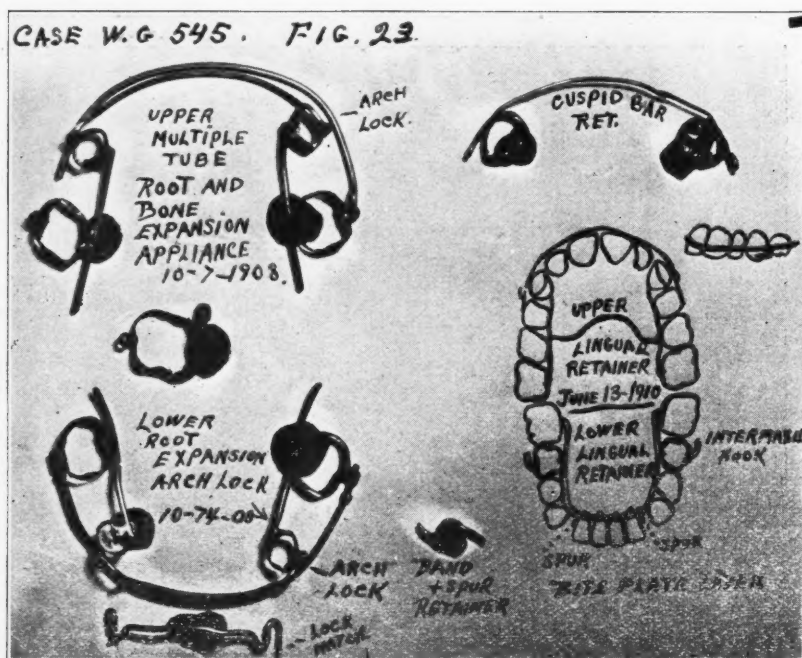


Fig. 23.

of five brothers under treatment. Weaned at 10 months at order of physician who claimed he had all babies weaned at that age. Attempted to suck thumb but the attempt was frustrated by mother at once. Two tonsil and adenoid operations in early childhood. Early in the expansion treatment when the incisor teeth were worked forward against the mass anchorage of cuspids to molars, it became evident that the lower incisors, cuspids and bicuspids were being tipped too far forward and the compromise treatment, of forcing

upper teeth back to meet what could be attained in the lowers, was given. During this latter treatment pulp in left upper lateral died of infection from a cavity under a filling and treatment stopped until the tooth seemed normal. The lower bicusps erupted turned

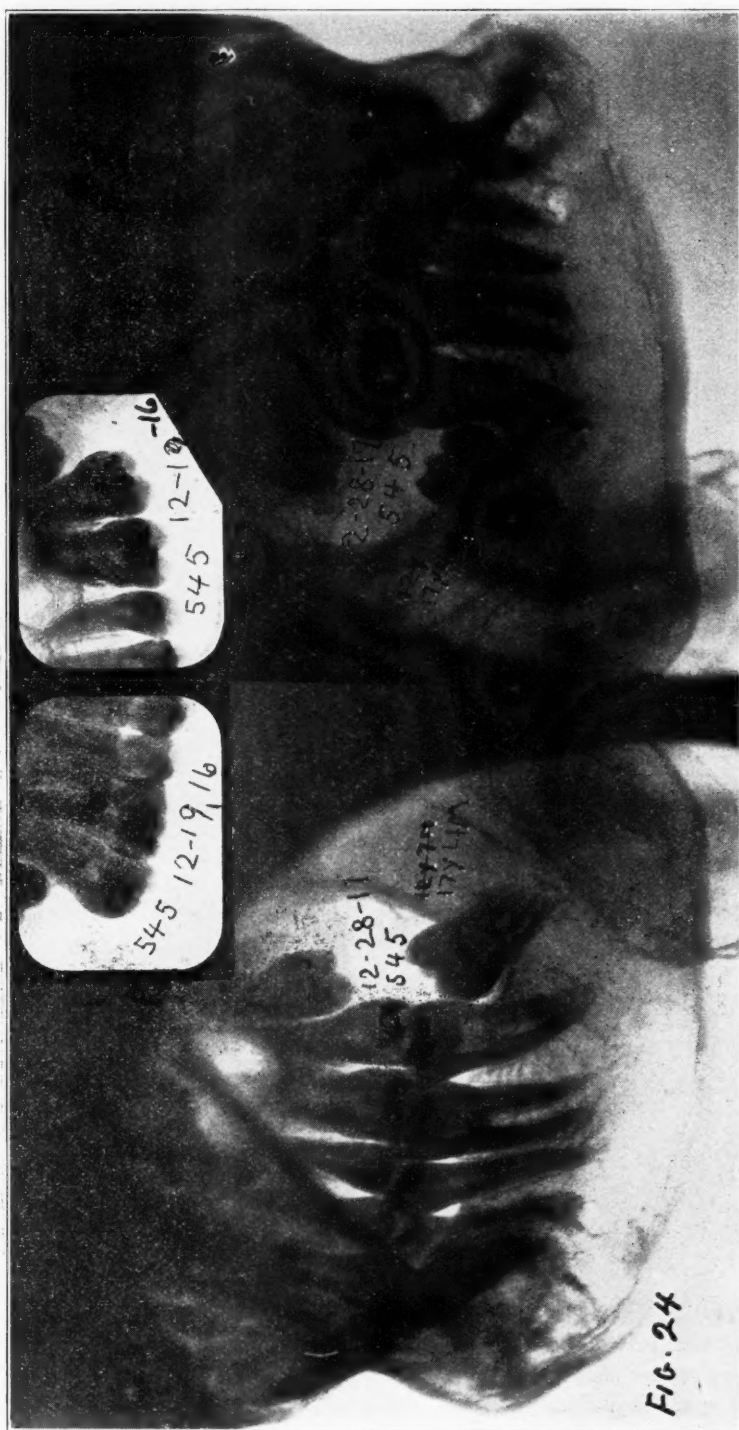


Fig. 24.

and oversized, complicating matters. The mandible seemed too small but results attained in the upper arch urged us to persist in expansion in the hope that subsequent development and prolonged retention might bring a solution without extraction. The small tongue room urged every effort to gain space and as the mother's mandible was strong

at tip and lower border there seemed a good chance for prolonged treatment and retention to finally give results.

The patient has a strong nervous organism and shows no impaction effects that can be noted. This also offered hope.

A brief summary of the case recording apparatus and retention:



Fig. 25.

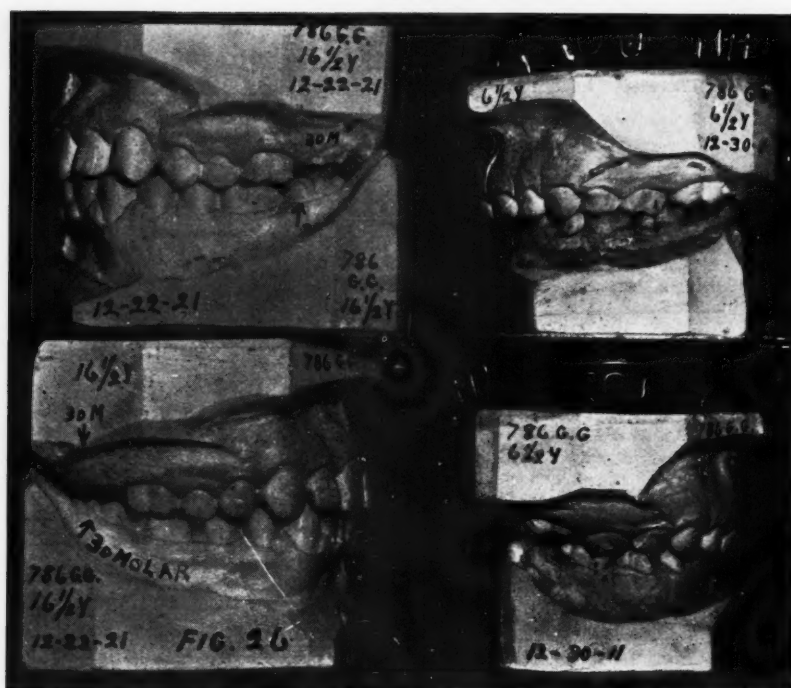


Fig. 26.

Start 9-19-08, Vertical appliances.

9-24-09, Horizontal arches and intermaxillary massing upper against lower-later forcing upper back.

6-13-10, Upper lingual and palatal bar retainer with cuspid labial bar and intermaxillary hooks.

6-20-10, Lower lingual bar and spur retainer and intermaxillary hooks. Fig. 23, holding room for cuspids.

4-18-14, Inclined plane bite plate retainer.

- 4-24-14, Lower horizontal expansion arch.
- 6-15-14, Lower retainer replaced.
- 12-31-15, Removed upper ret.
- 12-28-17, Extraoral head plates showing third molars.
- 4-1-20, Upper bite plane plate.



Fig. 27.

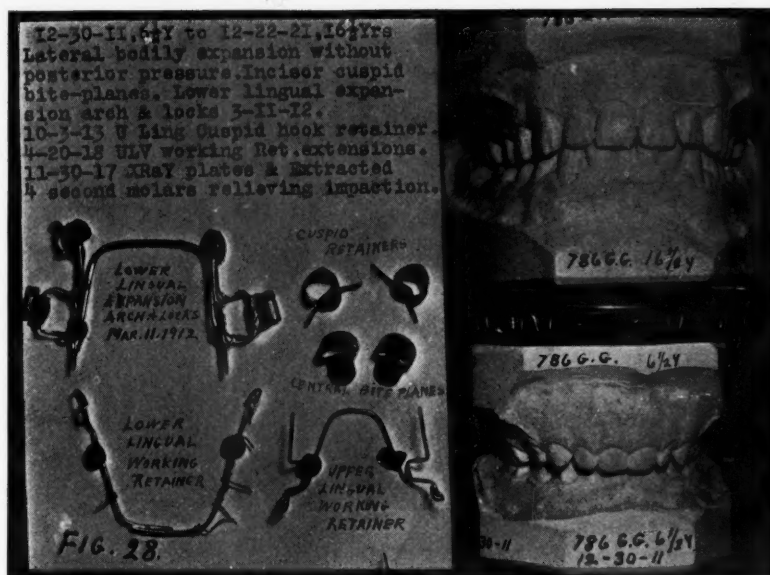


Fig. 28.

- 4-2-20, Lower lingual vertical arch with extensions for lateral and anterior expansion.

Figs. 20, 21, 22, 23, 24 and 25 show stages of treatment, apparatus, radiograms and profile. Note in all lower casts, and radiograms the forward inclination of teeth and in Fig. 25, the profile, the effect on lower lip.

This case still requires treatment. The third molars have at last been extracted to relieve the crowding in the hope that the rest of the teeth may settle to a more vertical and stable position. Treatment, retention and rest in this case has required fourteen

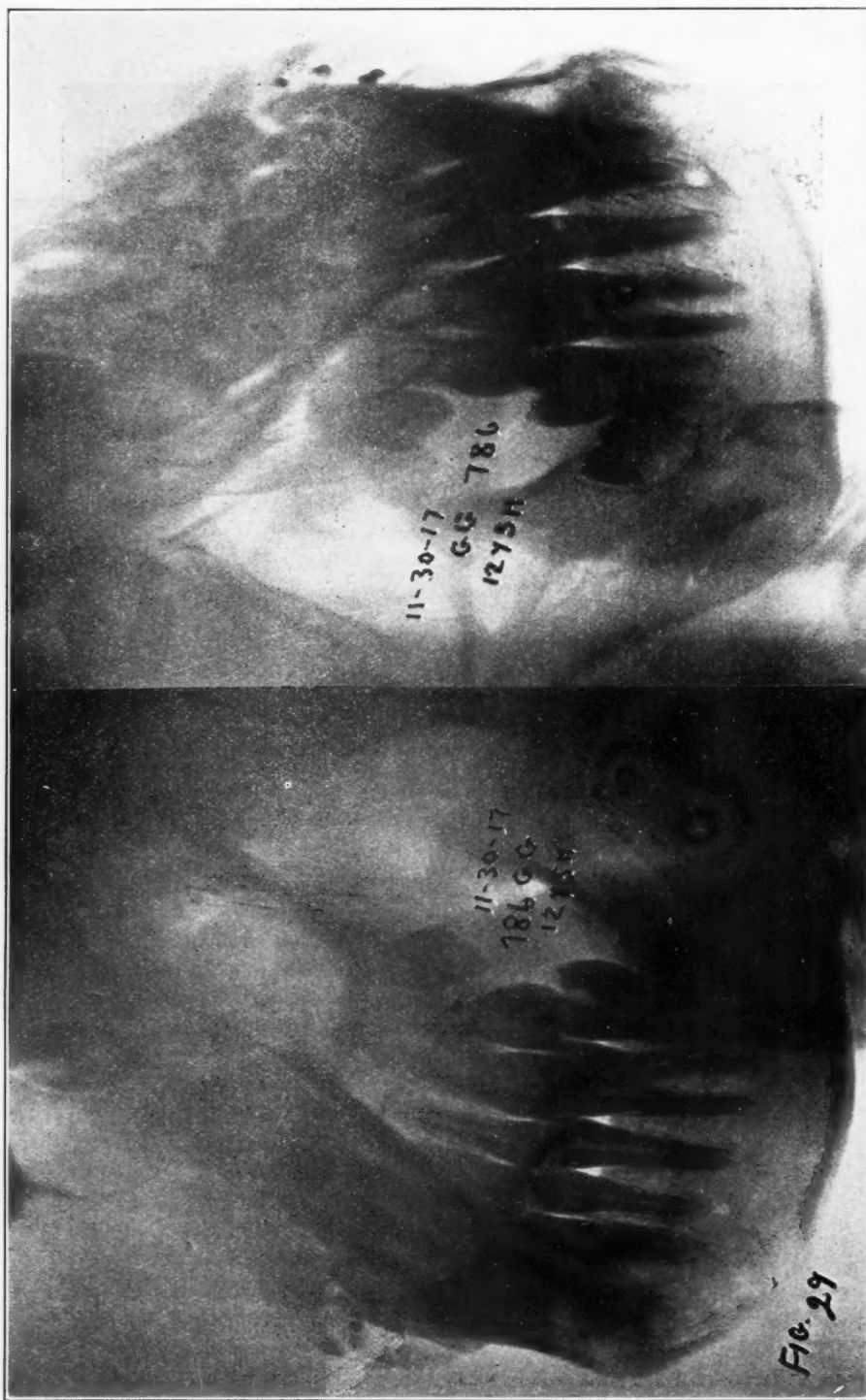


Fig. 29.

years, the young man is in college. The question is: Has it been worth while? Before answering this let us observe the next two cases, his brothers who are twins with similar deformity. Summary of treatments is given in Table IV.

TABLE IV.—CASE 545

	YEAR	TREATMENTS	HR.	MIN.	BRO. APPOINTMENTS
1st	1908	15	7	45	—
2d	1909	24	6	06	2
3d	1910	14	7	03	4
4th	1911	9	4	59	2
5th	1912	17	9	05	—
6th	1913	11	4	49	3
7th	1914	12	8	45	1
8th	1915	6	1	12	—
9th	1917	1		05	—
10th	1918	2	1	06	—
11th	1919	4	1	47	—
12th	1920	7	8	09	—
13th	1921	5	1	41	—
14th	1922	3		57	—
		130	63	29	12

CASE 786.—Twin brother of Case 778 and brother of Case 545. This boy and twin were weaned at six months—doctor's orders—same doctor who always weaned babies at

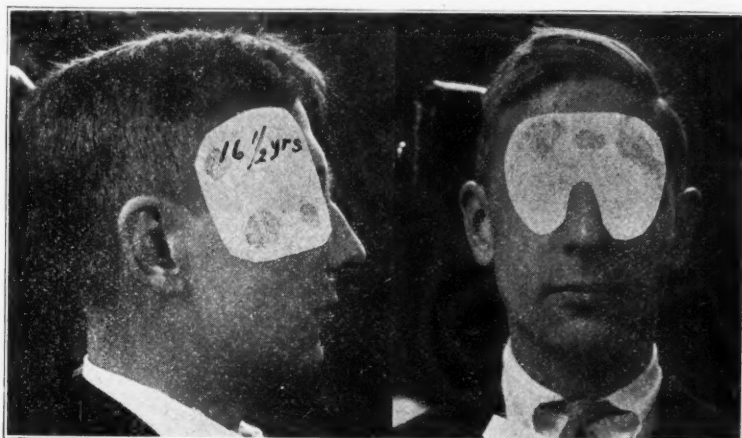


Fig. 30.

ten months. The evidence seems clear that these cases had some malnutrition on this evidence alone. The family dimly recall that both boys sucked thumbs fairly persistently but not enough to make it clear (This sucking (habit?) is evidently an expression of a craving for something, probably food, to satisfy nutrition). The habit was soon broken.

Start Feb. 8, 1912. Upper vertical root and bone expansion appliances with bite planes fitted to lingual bars. Fig. 26 which gives right and left views at 6½ years with overbite and posterior occlusion and upper first molars erupting before lowers—a characteristic indication of probable third molar impaction to follow. Fig. 26, right and left views of same case at 16½ years with third molars erupting in place of second molars which were extracted in 1918. Fig. 27. Occlusal views of same. Note third molars erupting with barely enough room—where could they or when could they have erupted had there been no extraction? Note bite plane appliance. Fig. 28. Front views of same and parts of appliances with notations including lower lingual arch and locks Mar. 11, 1912.

Fig. 29. Radiogram, extraoral, showing impaction—too close proximity to inferior dental canal: Second molars tipping backward. This evidence with the fact that the lowers had been brought forward all possible amount to the point of being markedly tipped forward, after full lateral bodily expansion, led to the conviction that extraction was the only way out. Second molars were extracted a year after the time they were radiographed and in the meantime every effort was made to find a solution without ex-

traction. Both of the twins were fine fellows but lively, hard to handle, and came into Cleveland from a suburb 25 miles out, making treatments for four and five at once a difficult matter, and this was made still worse by their going east to school. Note: Temporo-mandibular cracking, quite noticeable on opening of mouth, disappeared after second molar extraction.

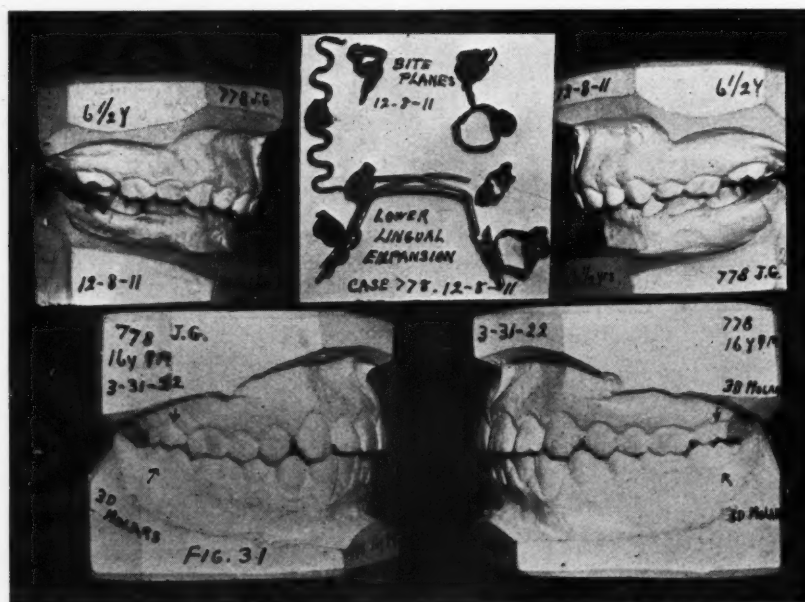


Fig. 31.

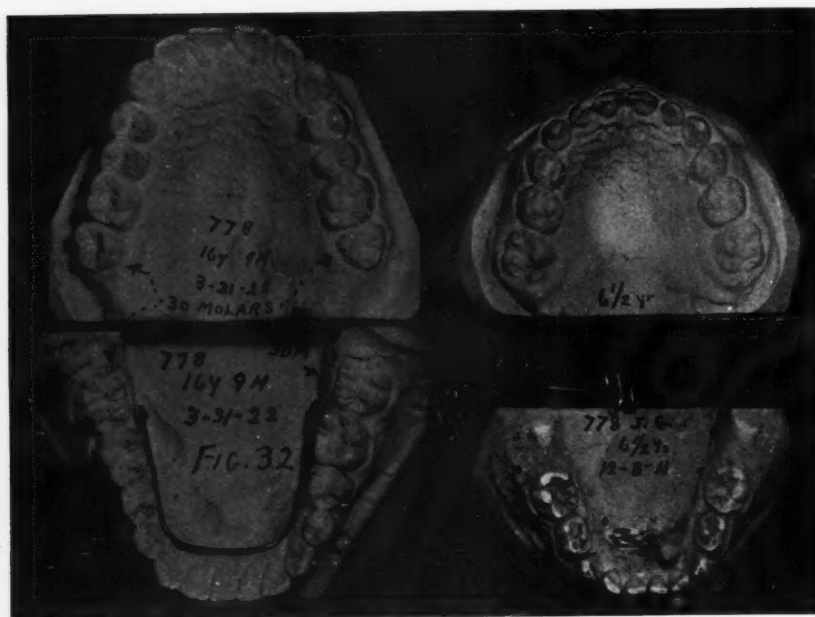


Fig. 32.

Fig. 30. Photographs at 16½ years, showing mandibular deficiency. This deficiency and slow development may be understood better through the fact that the lower first permanent molars could not be banded until patient was 9 years, 10 months old, as they were not through the gums.

Case is still under a slight treatment to align lower incisors. Summary of main treatments:

Start 2-8-12 U. appl.
 3-11-12 L. appl.
 10-3-13 Rem. U. ret.
 6-10-15 U. & L. appl. rem.
 3-12-18 Cem. L. H. appl.
 3-15-18 & 4-12-18 appl.
 4-20-18 Cem. U. V. appl.
 1-5-19 appl.
 1-6-19 Cem. L. ling. ret. appl.
 1-3-22 Cem. appl. (L. L. V. ext.)

Summary of time and years of treatment, given in Table V.

TABLE V.—CASE 786

	YEAR	TREATMENTS	HR.	MIN.	BRO. APPOINTMENTS
1st	1912	19	9	14	—
2d	1913	19	6	33	—
3d	1914	14	5	51	2
4th	1915	16	7	14	2
5th	1916	7	3	04	—
6th	1917	2		16	—
7th	1918	16	8	51	—
8th	1919	8	4	59	—
9th	1920	9	6	11	—
10th	1921	5	2	11	—
11th	1922	3	2	24	—
		118	56	48	4

CASE 778.—Twin brother of Case 786 and brother of 545.

Weaned at six months. Adenoid and tonsil operations. Start Dec. 8, 1911, 6½ years. Upper vertical tube and vertical end labial arches for root and bone expansion, making teeth of one side move the other. Bite planes fitted on appliance to open bite and allow better expansion of lower. No posterior pressures until full upper expansion attained with room for upper cuspids to erupt anterior to first temporary molars. At this point the lower incisors and cuspids tipped forward and the resistance at their roots was so great that it was deemed necessary to make a compromise treatment and move upper teeth back to what could be attained and held in lowers. March 20, 1915, intermaxillary rubber pressure had to be discontinued temporarily because of extraordinary temporomandibular cracking when mouth was opened—this had become painful as well as noisy. After a rest treatment was resumed carefully. Nov. 30, 1917, extraoral radiograms showed third molars impacting, second molars tipping backwards and their roots pressed close to first molars. This patient's mandibular teeth have never shown a good locking occlusion with the uppers and to date this still persists in a small degree. Considering this difficulty along with the experience of the older brother Case 545 and twin 786 the decision was made (with consultation) to extract the four second molars. After the extraction the cracking rapidly disappeared, being only very slightly noticeable now when an effort is made to reproduce it. Fig. 32 shows occlusal views, upper first molars erupting like brother's ahead of lowers, third molars erupted in place of extracted seconds, lingual and labial arches and retainer.

Fig. 31 shows right and left views of case at 6½ and 16¾ years. Note excessive overbite, parts of bite plane appliances used, lingual vertical end expansion arch, Dec. 18, 1911, and third molars erupting into place. Upper cuspids refuse to settle to interlocking position. Fig. 33 lower third molar impaction—seconds crowded against first. Upper third molars show good room but the solution lay in what could be attained in the lower, the jaw of the greater deficiency. With much regret the upper second molars

were taken out to allow harmonization of upper with lower. The only alternative would have been an excessive tipping forward of lower teeth, as the resistive bone around their roots would not permit any other treatment. The temporomandibular cracking clinched the matter and the results seem to justify the compromise in this case. Fig. 34.—Photo-



Fig. 33.

graphs showing mandibular deficiency which was characteristic of the father's side and the mother showed bimaxillary deficiency except at tip of chin.

Summary of treatment and time given in Table VI.

CASE 885.—Male. Start April 4, 1913. Age 11 years, 10 months. Vertical end root expansion appliances to expand without posterior pressure. Later side teeth massed

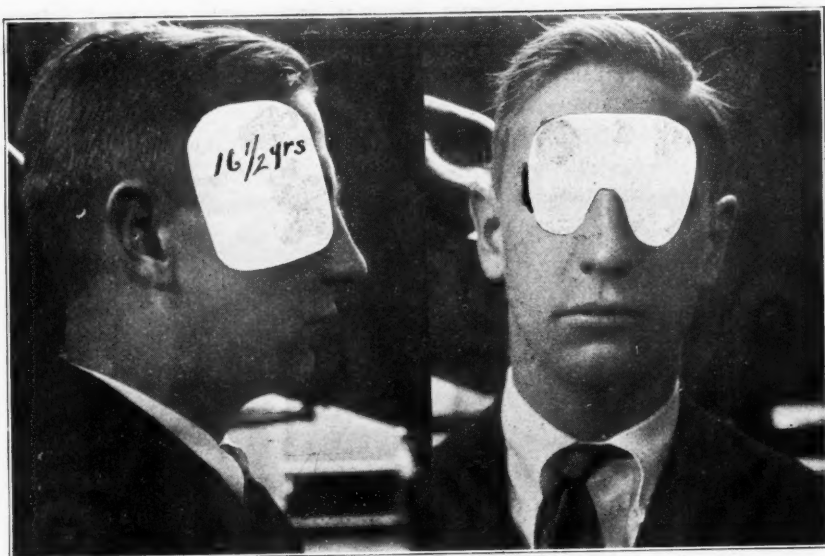


Fig. 34.

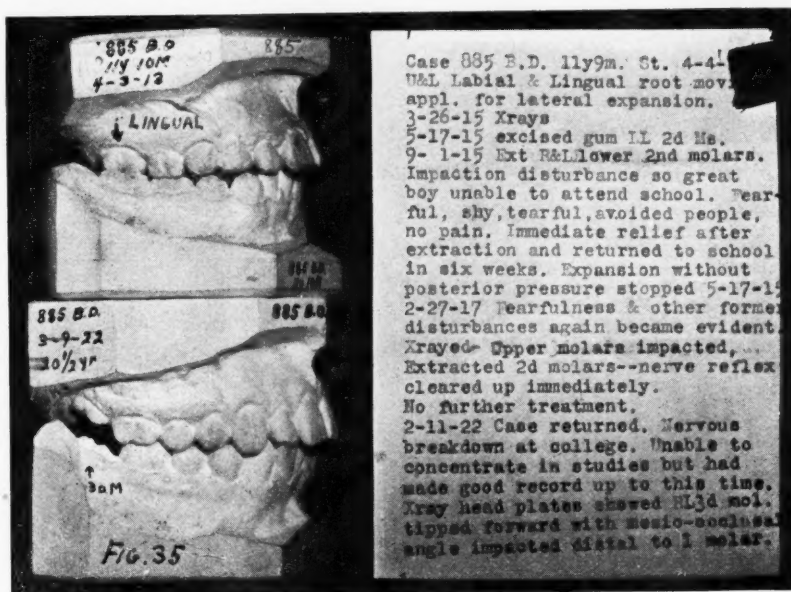


Fig. 35.

TABLE VI.—CASE 778

	YEAR	TREATMENTS	HR.	MIN.	BRO. APPOINTMENTS
1st	1911	4	3	38	—
2d	1912	22	14	28	3
3d	1913	20	7	56	—
4th	1914	14	9	11	—
5th	1915	13	4	38	1
6th	1916	8	4	13	—
7th	1917	2		17	—
8th	1918	14	14	29	—
9th	1919	9	6	16	—
10th	1920	7	3	15	1
11th	1921	6	1	35	—
		119	69	56	5

bodily against loosened incisors to move incisors into arch without forcing molars back.

Great resistance was met in the mandibular bone and it was found impossible to move incisors and cuspids forward except by tipping, therefore the uppers had to be moved back with intermaxillary force to meet what could be held in the lower. Treatment was not completed fully in this case and mechanically ended May 17, 1915, when



Fig. 36.



Fig. 37.

the gum had to be excised from occlusal of left lower second molar. Case rested without retention other than cusp function until September 1, 1915, when the boy had a nervous breakdown being unable to attend school. Radiogram 3/26/15 showed large crowned small rooted teeth impacting. Knowing this condition the writer advised the immediate

extraction of lower second molars to obtain the quickest relief at the center of pressure. This was done with immediate relief and the boy returned to school in six weeks. He had been so shy, fearful, and tearful and avoided people so much that his parents were almost distracted. The upper second molars allowed to remain in to show what might happen. The parents were warned, however, that they would probably have to be extracted to harmonize the arches. The parents were advised to notify me when any of the symptoms appeared similar to those prior to the breakdown. Feb. 27, 1917,

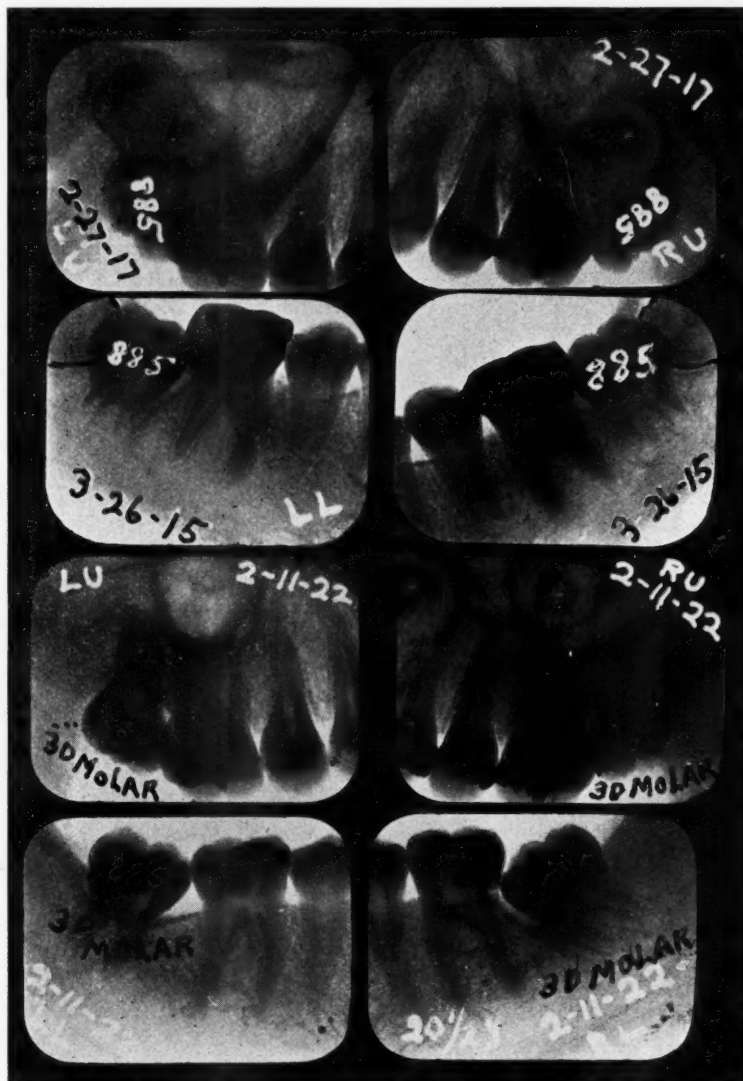


Fig. 38.

TABLE VII.—CASE 885

	YEAR	TREATMENTS	HR.	MIN.	BRO. APPOINTMENTS
1st	1913	38	15	47	—
2d	1914	30	10	41	—
3d	1915	8	2	03	—
4th	1916	1		08	—
5th	1917	4		19	—
6th	1920	1		02	—
7th	1922	2	1	58	—
		84	30	58	

fearfulness and other symptoms again began to appear. We immediately had the upper second molars extracted and the nervous reflexes cleared up almost immediately.

Feb. 11, 1922 patient returned. Nervous breakdown at college—unable to concentrate in studies but had made good record up to that time. Extraoral head plates showed right lower third molar impacted under distal of the first molar. The tipping of this

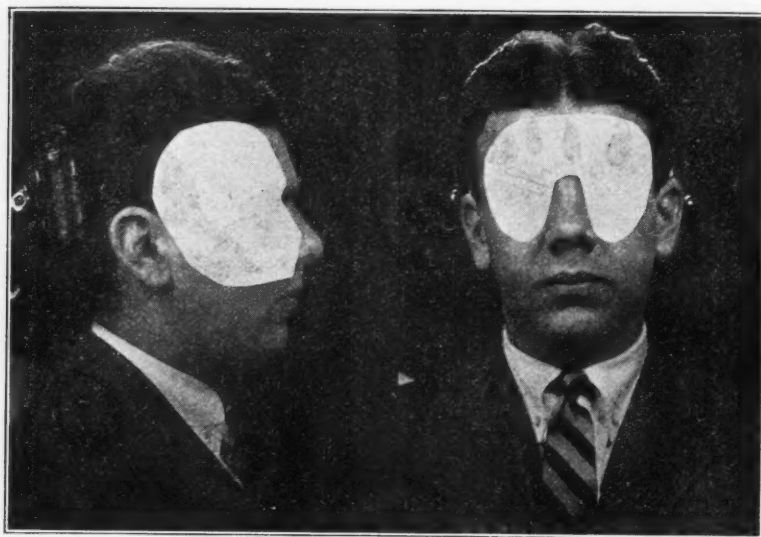


Fig. 40.

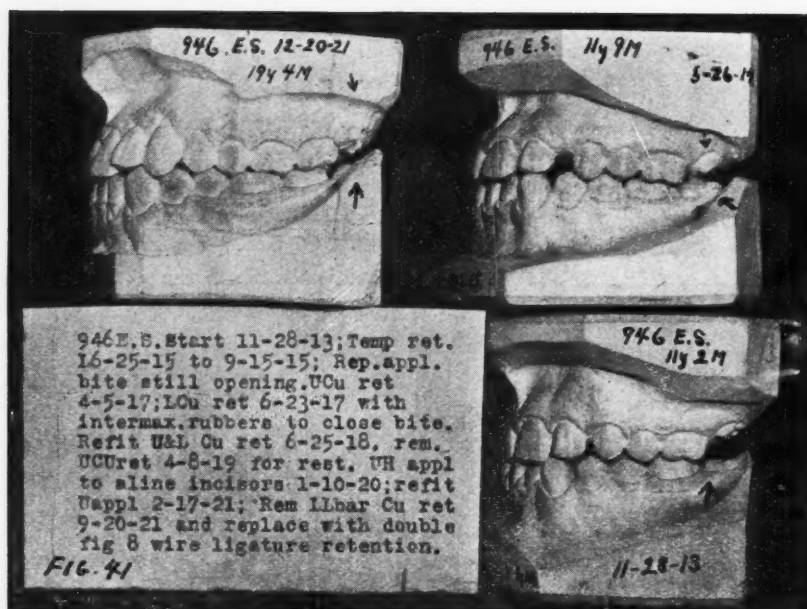


Fig. 41.

tooth carefully back and up was advised and carried out, giving relief again. The conditions in this case are that the boy has a weak nervous system that is easily broken down under too much stress—the impaction is one of the aggravating factors. Fig. 35 shows right views at 11 years, 10 months, and 20½ years with third molar erupted above. Note upper first molars bite lingual to lower and case record. Fig. 36 left and front views. Due to overbite lower incisors crowd and cuspids tip lingual. Note third molars.

Fig. 37 occlusal views showing large crowns. Fig. 38 film intraoral radiograms. Fig. 40 front and profile photographs.

Summary of treatment time is given in Table VII.

CASE 946.—Male, 11 years, 2 months old, calculated chart showed upper arch needed $\frac{1}{8}$ inch lateral expansion in molar region, $\frac{3}{8}$ in cuspid region and upper incisors needed for-

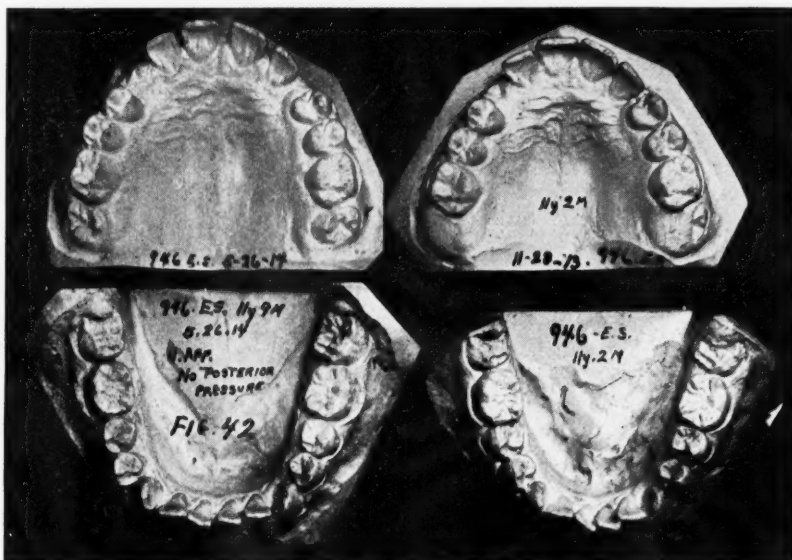


Fig. 42.

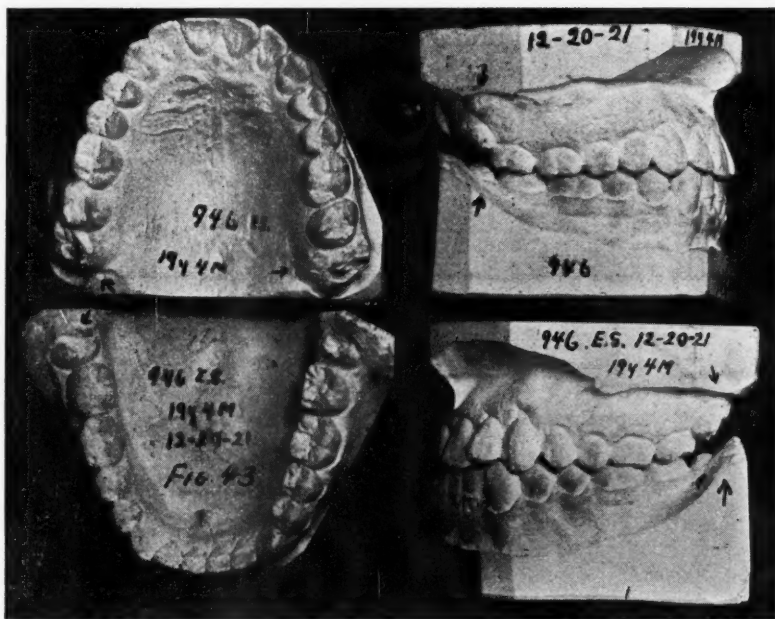


Fig. 43.

ward movement of about $\frac{3}{16}$ ths inch. Fig. 41 shows no overbite and no room for cuspids on left upper. Lower incisors and cuspids badly twisted. Root expansion appliances produced the result shown in the right of 11 years 9 months, cast and the condition at 19 years, 4 months is also shown. This case resisted treatment greatly in that it presented the condition of *open bite* developing during treatment and it was necessary to treat-retain-retreat

and retain again and again to counteract this opening. Horizontal end alignment arches were used after the lateral expansion and lingual cuspid bar and lingual retainers were used to pull and hold incisors to occlusion. Fig. 42 gives oclusal views at 11 years, 2 months

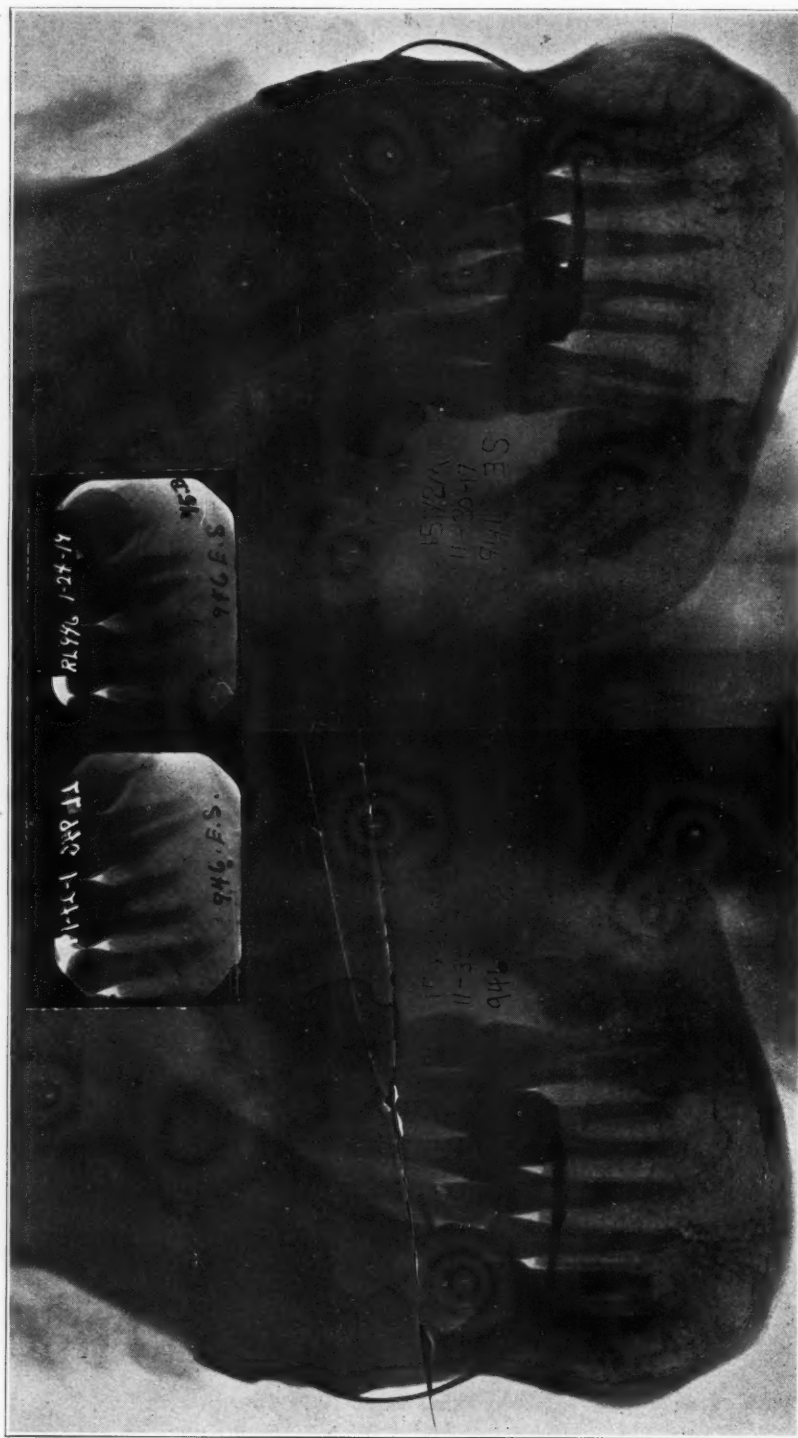


Fig. 44.

and 11 years, 9 months. Fig. 43 shows right, left and oclusal views at 19 years, 4 months with third molars erupting, the uppers particularly crowded and the impaction distributed

among all the teeth, spoiling a good occlusion. Note left upper lateral—it has been impossible to keep that tooth in line.

Fig. 44. Extraoral head plates taken Nov. 30, 1917, showing the third molar roots too close to inferior dental canal. At the time these were taken the open bite was being resisted with continual retention. The patient showed no noticeable nervous reflex. The good spacing of the roots anterior to third molars seemed to indicate that they (the third molars) would erupt in time but the operator felt certain that the third molar pressure had something to do with the open bite development. The parents were called in and conditions put before them. It was stated as a *possibility that the pressure had something to do with the opening of the bite*—that possibly the extraction of the second or third molars might stop the pressure and the opening as well, and would shorten treatment. *On the other hand was offered only prolonged treatment and retention.* They chose the latter. The question now is: will the third molars be useful? Shall they have to be extracted? Note gums over lower thirds (Fig. 43). Could there have been any other solution? 6 months later third molars were extracted on account of gum irritation. Then the case settled down to a stable occlusion. Note.—Obtuse angle of mandible.

Summary of time and treatments given in Table VIII.



Fig. 46.

TABLE VIII.—CASE 946

	YEAR	TREATMENTS	HR.	MIN.	BRO. APPOINTMENTS
1st	1913	7	8	49	—
2d	1914	31	15	54	2
3d	1915	29	4	77	—
4th	1916	25	6	53	2
5th	1917	32	11	29	1
6th	1918	28	11	16	1
7th	1919	10	1	40	1
8th	1920	24	4	57	1
9th	1921	20	4	06	3
		206	70	21	11

Treatment has had to be continuous.

CASE 1034.—Female. Start Jan. 5, 1915, 10½ years. Apparently simple case requiring about 4½ mm. lateral expansion as indicated by theoretical arch calculation. Upper and lower labial and lingual nickel-silver vertical end expansion arches (lingual arches with arch locks) for root and bone expansion.

Upper and lower incisors moved and rotated to arch curve to permit forward eruption of cuspids anterior to temporary molars. This later permitted forward movement of bicuspid so that first molars could move forward away from second and third molars. No posterior pressures used in case. Resistance to movement excessive. Persistent tendency for upper central to separate and rotate. Simple retention band and bar and wire ligatures.



Fig. 48.

This case was not given as thorough a lateral root expansion as usual, as it did not seem to require it, but subsequent results indicate that overexpansion might have given better results.

Fig. 46: right and left and extracted third molars. Fig. 47: occlusal. Radiographs 5-7-14. Fig. 48 showed second molar roots curved posteriorly, other roots well separated, third molars crowding against distal of seconds. Later development considered a possible

relief, case marked to be watched. Apparently third molars might erupt with some crowding. Radiograph external plates Mar. 22, 1921, third molars not erupting, the lower molar roots curved posteriorly and evidently encroaching on inferior dental canal. Fig. 49.—Patient complained of pressure between teeth particularly when tired, also stated that the pressure seemed to be applied at the side of the head or on the cheeks. Had headaches but did not herself attribute them to the teeth. Sept., 1921, the lower third



Fig. 49.

molars were extracted as the writer felt certain that they were responsible for the reflexes complained of, as well as for the prevention of the teeth settling to a good interlocking on removal of the retainers which have to be worn for years to combat a strong retrograde tendency.

Jan. 11, 1921, patient returned radiant with joy as she said the headaches and pressures had disappeared since the extraction. The extraction of upper third molars was

advised later to remove pressure in upper arch which might prevent good occlusion.

Summary of chief records:

No. 1034

Start 12-31-14

1- 5-15 Cem. U. & L. V. appl.

7-17-16 Temp. ret.

6-17-18 Cem. U. cen. & L. cus. ret.

5- 7-19 X-ray plates 3rd mols.

5-27-19 Rem. U. ret.

5-18-20 Rem. L. ret.

Sept, 1921 3rd mol. extracted.

Summary of time treatment is given in Table IX.

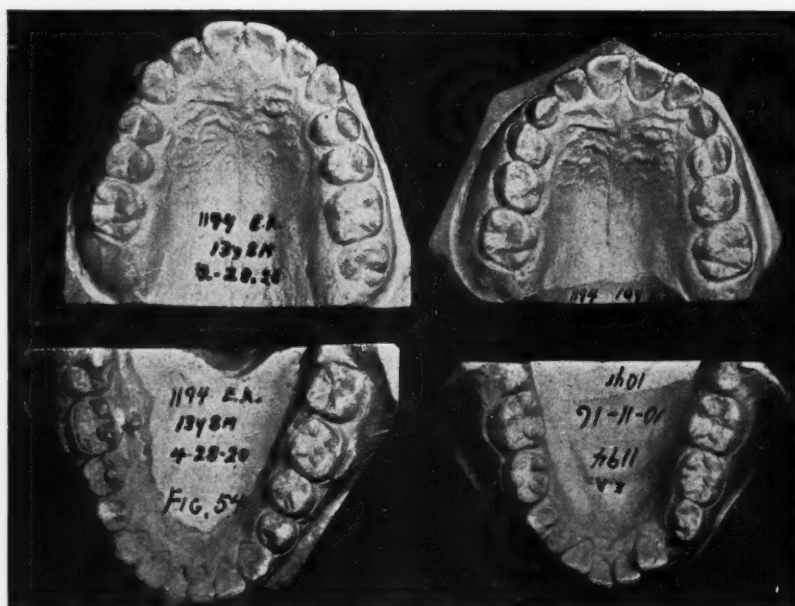


Fig. 54.

TABLE IX.—CASE 1034

	YEAR	TREATMENTS	HR.	MIN.	BRO. APPOINTMENTS
1st	1914	3	1	52	—
2d	1915	27	15	06	—
3d	1916	19	4	45	—
4th	1917	18	5	42	—
5th	1918	19	5	35	—
6th	1919	8	1	07	—
7th	1920	6	1	12	—
8th	1921	5	2	04	—
9th	1922	1		07	—
		106	37	30	—

CASE 1194.—Female, 10 years old at start, Oct. 11, 1916. Oct. 30, 1916. Upper vertical bite plane expansion appliance for root lateral expansion and to open bite and permit forward movement of lower teeth. Feb. 23, 1917. Lateral expansion complete. Incisors then worked forward in pairs against massed anchorage of cuspids to molars. July 10, 1919. Lower lingual vertical end retainer. Jan. 28, 1920. Second molar extensions added to tip second molar crowns outward and vertical. March 5, 1920. Extraoral radiograms showed third molars impacting. March 31, 1921. Extraoral radiograms showed third molars



Fig. 55.

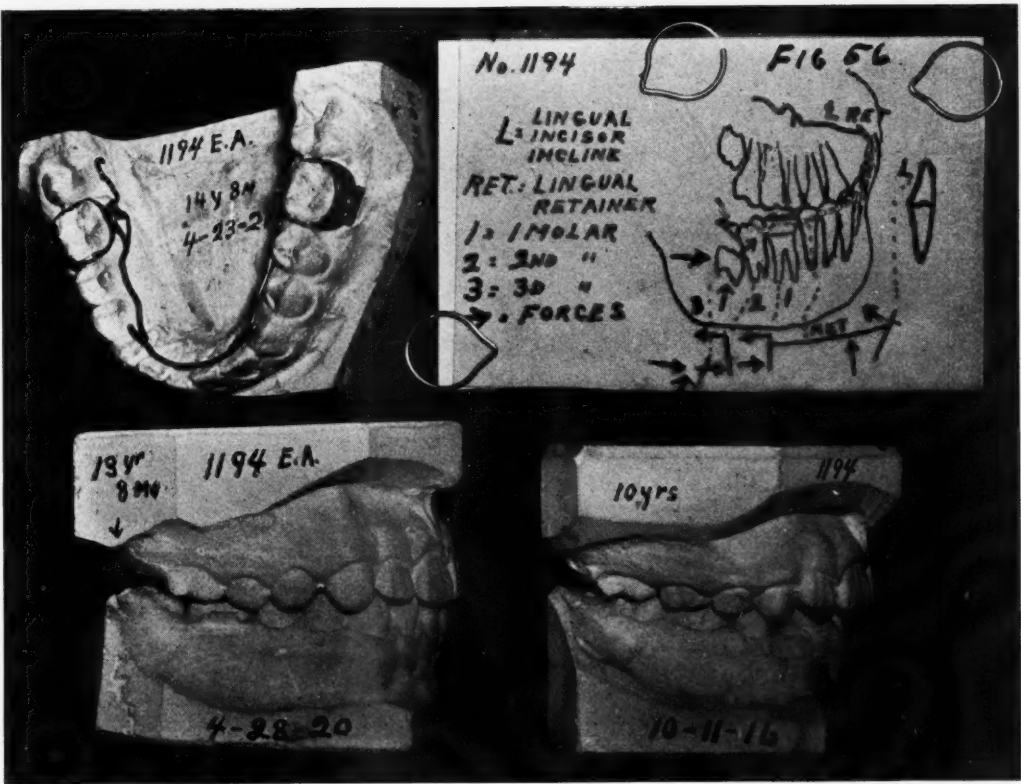


Fig. 56.

greater impaction. October 6, 1921. Refitted upper crown and plane appliance to open bite for better movement of lower teeth and to relieve functional retention resistance if it were a factor in the impaction. Upper teeth during a rest and while waiting a decision as to what to do, had *tipped lingually to fit the lesser expansion obtained in the lower*. Jan. 9, 1922. Refitted lower lingual vertical, end expansion arch with forward extensions. The upper teeth move easily—the lowers resist greatly. Extraction of the four second molars



Fig. 57.

in this case is advised but the treatment was again resorted to as a last chance, hoping that conditions of resistance might have changed. They have not changed and extraction will be resorted to.

Fig. 54. Occlusal views at ten years and 13 years, 8 months. Note crowded eruption of second molars and deficient development in lower deciduous teeth region.

Fig. 55. Left views at 10 years, 13 years, 8 months and lower at 14 years, 8 months,

showing first and second molars tipping posterior, and lingual. Case 693 her brother's cast had serious third molar impactions.

Fig. 56. Right views and occlusal of retention cast, also chart outlining the lingual



Fig. 58.

retention and illustrating what happened. Chart was made from radiogram. It shows second and third molars tipped backward and the third molar crown pressing forward and up against the second molar which in turn has its roots moved forward and crown back.

The first molar in turn is pressed in like manner. At the same time the lingual retainer acting as a long lever resting against the lingual inclines of incisors and cuspids is wedged upwards, increasing the leverage and augments the damage being instituted by the third molar pressure. At the start of retention the anterior part of the lingual retention arch was ligated to the incisors but the patient broke the double figure eight wire ligatures, did not report and further increased the damage by poking her tongue under and lifting the arch.

Whether or not this is the real cause of the tipping molars the fact remains that the retention appliance with the teeth act as a mass resistance and must aggravate the impactive pressures; the arrows illustrate the direction of forces acting. Fig. 57. Radiograms at 13 years, 7 months. Fig. 58. Radiograms at 14 years, 8 months. Fig. 59. Photographs showing convex type of face and full lips with mandibular deficiency.



Fig. 59.

Summary of time treatments indicating continuous treatment given in Table X.

TABLE X.—CASE 1194. ELEANOR ASSMUS

	YEAR	TREATMENTS	HR.	MIN.	BRO. APPOINTMENTS
1st	1916	13	9	26	—
2d	1917	20	5	05	1
3d	1918	21	5	25	2
4th	1919	23	6	08	7
5th	1920	16	4	56	4
6th	1921	22	10	07	5
7th	1922	10	2	52	2
		125	43	59	21

Time and space do not permit in this study any consideration of extractions other than second or third molars.

The writer had an extensive experience with extraction of bicuspids twenty years ago but bicuspid extraction left so many evils that other solutions of these compromise cases have been sought. Many cases have been treated and retained for years only to result in serious third molar extractions. Personally the writer has twice experienced lower third molar impaction extractions suffering a fractured mandible as part of that experience and enduring almost unconsciously the nerve irritation which was relieved after the extraction, and only clearly noted by its absence. Consequently the writer, after seeing others suffer as well as experiencing it himself, does not want to advise patients to endure prolonged treatment and wind up with

third molar extractions which are never other than evil. The *preventive treatment of entering the third molar crypt and taking out the undeveloped crown has been considered as a possibility*. That possibility was suggested in a way by Dr. C. S. Case's plan of 25 years ago—of going up after the upper first bicuspid and extracting it in what he called upper protrusion cases. However, to date, no exodontist with whom the writer has been in touch, seems to favor the idea and there is much question as to the damage that might be done in such an operation. Further such extraction would have to be done at so early an age as to still leave considerable doubt about the wisdom of any extraction or of discounting the possibility of later development. Again, conditions which might call for such third molar extraction might have already altered second molar position and root development—leaving that deformity uncorrectable and an evil. Relieving third molar stress at 11 to 14 years of age by second molar extraction allows third molars to develop their roots under less stress and as far better teeth. It permits third molars to erupt into positions where they can be kept clean and filled when necessary. Third molars are erratic teeth at times but not always. Their form may be fairly well diagnosed by radiography and under many conditions they may develop as far better teeth than those for which they may be made to substitute. *All extractions must be considered an evil—a compromise—and should offer a lesser evil than any condition without extraction*. No rule can be laid down for wise extractions; the condition of patients and the resistance met must guide in each case. We must always regret necessity for extraction and *consider ourselves on the defensive when we feel compelled to resort to it*.

There are delayed development cases. These cases are apparently rare, nevertheless they offer possibilities of results which should make every orthodontist and dentist stop and consider very carefully what the possibilities are in the future when extraction of any teeth is being considered as a compromise or shortened treatment.

Some cases persistently followed up, expanded, harmonized, retained in dental function for year after year eventually show marvelous and almost unbelievable results. Often the cooperation of patient, parent and operator is seemingly the greatest combination of factors which give results desired, provided the method of treatment is correct both physically and physiologically.

One of the factors in final retention which cannot be ignored is muscle pressure acting upon the buccal and labial surfaces, particularly where the dental arches have been expanded beyond a truly harmonious relation with the fundamental jawbone development. An illustration of this is where the maxillary or mandibular development is much less than that of the other; either in lateral anteroposterior, or V-development or combination of these. If one jaw is more underdeveloped than the other, the pull of the muscles will naturally be altered, and the lateral stress from such muscles will be exerted in a perverted direction, tending to force the teeth in the jaw of the greater deficiency still further lingual, and will usually force the teeth

of the greater developed jaw to tip lingually to meet the lesser development.

Years of retention do not seem to overcome this difficulty or tendency, and the *plan of retention should consider this muscle pressure as a definite factor to be overcome in retention*, or it must be taken into consideration if the expansion moves the teeth through the bone and does not move the jawbone with it to the extent desired. It is almost certain that the lateral stress of the muscle pressure will tend to tip the teeth lingually, to a point where that stress will be practically eliminated. Therefore in our expansion, if we find that we cannot expand the bone to the amount desired, and harmoniously in both jaws, we may have then to accept a compromise; and consider the possibility of *some extraction as a lesser evil to the recrowding of teeth*, and to the recurrence or reformation of impacted teeth conditions. In reality, in such cases, impaction is not entirely eliminated without some extraction.

In the condition of excessive overbite or overlap of incisors and cuspids of maxilla over those of the mandible, where the teeth are in contact, there may be a seeming regularity of maxillary teeth and an excessive crowding of incisors and cuspids. In this condition the mandibular teeth touch the maxillary teeth near the cervical margin where the labiolingual diameter is greatest, whereas the contact should be near the occlusal margin where the labiolingual diameter is least.

After orthodontic treatment of expansion and tooth alignment and following removal of retention appliances, there too often results a secondary crowding of incisors and cuspids chiefly in the mandible and particularly this is so in the overbite or overlap of incisors and where there is the excess pressure of impacting third molars. The overbite and impaction are both secondary causes of the recurrent crowding of front teeth—the impaction aggravating the crowding of the overbite and of course producing excessive mesiodistal contact pressure of other teeth.

Retention devices, however ingeniously they may be made, unless they relieve impaction and overbite, are a failure—a temporary means of postponing the evil day of reckoning.

The cases reported here are taken from records of 450 cases with extra-oral radiograms. Of these, second molars were extracted in 41 cases; third molars in 22 cases.

The following letter and synopsis of a paper offered to the American Society of Orthodontists early in the year of 1908, clearly prove the period of study which has been given the subject presented:

Dr. Varney E. Barnes,
Cleveland, Ohio.

May 14, 1908.

My dear Dr. Barnes.—Please pardon the seeming delay in coming to a decision in regard to your paper, but as long as you were good enough to offer us two papers and furnish a synopsis of both, it became a question of selection and I felt it would be courtesy to the other officers, and especially to the President, to let them have a choice in the matter. It is the unanimous opinion that paper No. 1 is preferable, and as this is your own choice, I presume we may consider the matter settled. You may let me have the exact title at your convenience. Very cordially yours, R. Ottolengui.

SYNOPSIS OF PAPER OFFERED AMERICAN SOCIETY OF ORTHODONTISTS
(ABOUT APRIL) 1908

THE RATIONAL TREATMENT OF DENTAL IRREGULARITIES

Irregularities caused by many conditions result in maldevelopment of maxilla and mandible, in unequal development of these bones, therefore, the rational treatment must consider the stimulation, development or coordination of this bone development, with tooth movement direct to normal inclinations or positions, or to such positions as will be self-retaining. Bone expansion if possible, if not then tooth and alveolas as near normal as possible.

This means early treatment—as young as the patient can be handled—while the bones are pliable—while the pressure can be put upon temporary teeth—while the roots of the temporary teeth are not resorbed. It means pressure applied laterally over the entire tooth area and not by means of the ordinary horizontal hinge appliance which tilts the teeth. It means that generally, possibly always, the distal movement of teeth is not towards the normal, that it is a compromise, generally an evil and liable to reproduce the irregularity through encroachment upon the area of other teeth yet to come.

The rational treatment should aim to reproduce the exact conditions, which Nature working normally should have produced at that age. Little or no dependence should be placed upon subsequent bone development due to pressure stimulation. When arches are expanded they should be carried to the point of apparently too much—first, to allow for distal displacement of molars in expanding anterior portion—second, to bring the anterior teeth far enough forward to allow for the proper placing of the second bicuspid, this will open up considerable space between second bicuspid and first molars, which then may be taken up by the forward pressure of developing second and third molars or, by mechanical pressure. The foregoing is provided both jaws are similarly affected, or not far out of proportion in development. When there is great difference in development, for instance a marked underdevelopment of the lower jaw, it may be necessary to compromise in the treatment of the upper. The teeth anterior to the molars should then not be expanded to the former extent but may even be moved distally, but this must be recognized as a compromise, may be detrimental in some cases, and is likely to prove impossible to maintain (if growth is not completed). The alternative in such a case may be extraction of the first upper bicuspid or second upper permanent molars. This may seem extreme and a retrograde movement; it is liable to be, unless extreme care is taken. Treatment without extraction should first be tried or the operator should have had years of special training; no hard and fixed rule can apply. The appliances used should involve the Ainsworth or vertical hinge principle, with bands and bars holding several teeth together causing root movements and bone expansion. In the upper opening the median suture is desirable. This treatment is alike on both temporary and permanent teeth. The rational treatment should be early treatment, because bone is more pliable, and proper pressure upon the temporary influences the permanent teeth, and provides

better root positions. Little children are easier to handle, require fewer sittings, and school and other engagements do not conflict.

In marked retrusions of the mandible or maxilla it is yet somewhat of a question just how much regulation should be attempted. In these cases expansion to give width and prevent crowding is essential, for the rest experience and judgment must for the present indicate the proper proceeding.

Retention must not be expected to retain or maintain normal conditions when such a condition has not been attained. In our treatment of dental irregularities we should recognize the fact that dental deformities do not involve all the deformities of the skull and anatomy and therefore, the corrective treatment with or without extraction, must not always be expected to give a superlative result or one harmonious to distorted features and skulls.

DISCUSSION

Dr. Frank M. Casto, Cleveland, Ohio.—Some one has said that "progress is the coordination of ideas into realities." This may well be said of the results of the work that Dr. Barnes has presented here today. The subject has concerned and interested me very much. It is one in which many principles and factors are involved. If the question of retention of the teeth in orthodontic procedure is fundamental, and I think it is, and if the question of impactions is fundamental, and I think we all agree that it is, then what Dr. Barnes has presented is of the utmost importance.

No doubt we have all thought more or less of these things. We have discussed many of them informally, but the duty has been left to Dr. Barnes to correlate, organize, and classify the knowledge on the principles involved, and assume the responsibility for presenting them to the profession. This has required great courage and conviction. The possibilities, yes, the probabilities of being misunderstood and misinterpreted are very great, indeed very likely. Dr. Barnes has not gone into this proposition blindly, or without thought, and consideration; on the contrary, he has devoted many years to its study and investigation, has observed and treated many cases, and has always been ultraconservative before final decision was reached or final action determined upon. I should be very derelict in my duties if I did not say these few words in his behalf. Dr. Barnes has been very kind and generous to me with regard to the work that he is doing, and especially with what he presented here today. He invited me into his office on divers occasions to inspect and observe the cases he had under treatment, as outlined in his presentation, and to review cases that had been completed in accordance with the same method. He submitted all the data and evidence at his command, and after a careful study, consideration, and criticism, I am convinced that a compromise treatment was indicated in these specific cases, that the procedure instituted and carried out was correct, and that the very best service was rendered the patients under the existing conditions. If we are to accept the dictum that the responsibility of the orthodontist is not relieved until the third molars are accounted for, then we must begin to think more seriously along the whole line of treatment. We must think more seriously over the proposition of the essayist. It has been said, and not without good reason, that during all time men have had to be goaded into thinking. Emergencies have only been met in that way. It has always been true in every profession that a certain individual or a group of individuals have had to come forward with an idea or proposition and stick to it tenaciously and persistently, and be endowed with great perseverance and strength of conviction in order that others might be convinced of its merit, or that it might receive proper consideration. Many times this has been done at a great personal sacrifice.

To come before this Society and advocate the extraction of the four second molar

teeth as part of our orthodontic procedure, whether it be for the relief of third molar impactions, or the relief of stress upon the entire dental arches requires courage, because a wide field for discussion is immediately opened and criticism and condemnation invited. Many opinions will be expressed and conclusions arrived at without proper investigation, careful study, or mature thought. Traditions are all against the extraction of teeth, particularly for orthodontic treatment. Therefore, the question immediately resolves itself in a very serious problem.

While I have discussed the question quite thoroughly with the essayist, and, as I said before, had the privilege of observing his work, and especially the cases he presented here, and while I am firmly convinced that his diagnosis and treatment of these special cases was justifiable and proper, as evidenced by results, I am not in a position as yet to express an intelligent opinion as to how far such practice may be indulged in or pursued. I think, therefore, that in justice to the essayist, the discussion should be confined, insofar as extractions are concerned, to the type of cases he has presented or had under treatment. If any one can suggest, or has a better method of treatment in this particular class of cases, and can show as good or better results, the essayist has informed me that he is perfectly willing to accept it. I am probably in the same position as many orthodontists, in that, I have advised the extraction of one, and sometimes two second molars to relieve third molar impactions, and overcrowded conditions in the dental arch, I have resorted to this practice in a very few cases, possibly five or six. In discussing it with other men, however, I find that it has been done more frequently than I suspected. I have never advised the removal of the four second molars. It might have been the best treatment in some cases but I did not have the courage to do it. Possibly this was due to the lack of knowledge or understanding. The influence of the work of Dr. Barnes may change our viewpoint, and enable us to treat this class of cases better and more scientifically. There is no disputing the fact that a considerable number of third molars become impacted and that the result in many cases is a disarrangement of the teeth, a severe crowding of the dental arches, the producing of nervous phenomena, and other pathological conditions, with which you are all familiar. It is, therefore, obvious that we are compelled to deal with the problem whether we wish to or not. If we will make a thorough, careful and scientific study of the causes of impactions, it will assist materially in the intelligent diagnosis and treatment of such cases. There are at least two principal reasons for this condition.

First, while the question is still debatable, I believe the fact is pretty well established that in the evolution of civilized man the jaws are in a constant process of recession. This being the case, it becomes perfectly obvious that there is not room for the full complement of teeth. The third molars being the last to develop, and being located at the posterior part of the dental arches are affected most by this process. To be fairly well convinced one needs to go no further than to study the shape of the skulls of the prehistoric man, or even the negro, and compare them with the present day white man. Impacted third molars are extremely rare in the negro. This is easily explained by a consideration of the facial angle, which is the angle formed by a line passing from the lower border of the orbit down and forward to the symphysis of the mandible, then backward and upward to the lower border of the mastoid process of the temporal bone. On account of the protrusion of the face and jaws of the negro, the angle at the symphysis is quite acute, the line from the symphysis to the mastoid process being much longer proportionally than in the white man, which allows more room, and permits of more space for the development and eruption of the teeth. The facial angle at the symphysis in the white man is considerably more obtuse, the distance between the symphysis and the mastoid process considerably shorter, which constricts and hampers the development and eruption of the teeth. As the jaws recede, the angle becomes more obtuse, and the line between the symphysis and mastoid process progressively shorter, which further restricts the teeth. Third molar impactions, therefore, really become an anthropological problem which, in turn, makes it of great significance to us.

Second, it is a well-recognized embryological law that there are two impaction areas, namely, the region of the upper canines and the lower third molars. These are accounted for by the axes of growth or development of the teeth, the axes being the junction or composite of two planes. When these are studied it is found that there are two zones of conflict, or overlapping, which are predisposing causes of impactions. In considering the posterior teeth in the lower jaws, we find that beginning with the first premolars, the axes of movement is upward slightly posterior and to the lingual, the second premolar almost vertical and to the lingual, the first molar upward very slightly anterior and to the lingual, the second molar upward more anterior and to the lingual, and the third molar upward still more anterior and to the lingual. Thus these planes being convergent will finally come to a focus, which would be a point somewhere above the posterior part of the hard palate.

The conclusions to be drawn, therefore, would be that impactions are more likely to occur because of the convergence of the axes of movement, which constricts the area into which the teeth can develop and erupt. The farther the focus of convergence is removed from the tooth crown, the less probability of impaction. Conversely, the nearer the focus is to the crowns of the teeth, the greater the likelihood of impaction. The axes of movement is an embryological factor. There are other factors, of course, which must contribute in order that the tooth may assume its correct position, the principal ones of which are the physiological and mechanical factors. In consideration of these things it is very easy to understand why third molars become impacted so frequently because even slight interference may have a very damaging effect.

Dr. Barnes has called attention to the evil effect upon the unerupted molar teeth by the use of appliances which displace or tilt the molars distally. In the lower jaw, such displacements or tilting by means of appliances would surely interfere with the axes of movement of the teeth, and would immediately break up the harmonious combination of growth and development.

The question of function is always one to be considered. Probably the shortening of the jaws, and the lack of normal development is more dependent upon this than any other one factor, so we are confronted with this problem in every case that we have under orthodontic treatment.

The consensus of opinion of the profession has always been that third molars are of little, if any, value; first, because of their position in the arch; second, because they are usually considered to be malformed and poorly developed teeth. While this is true more frequently with the third molars than any other tooth, I believe it to be greatly exaggerated. If the third molars are left to develop in a constricted and crowded area, the natural processes will be interfered with, and an abnormal tooth will result. The severity of the deformity will depend upon the interference, but in those cases in which there is sufficient room and no mechanical or pathological interference, the third molars usually develop to a normal shape and size. I have examined a considerable number of x-ray plates of children's jaws between the ages of nine and fifteen, and have been surprised to find that practically all of the crowns of the third molars appeared to be normal. What the final outcome of these cases will be, however, is problematical.

Dr. A. H. Ketcham, Denver, Colorado.—I have listened to Doctor Barnes' paper with interest and agree with him in regard to the importance of a thorough x-ray diagnosis in orthodontia cases.

My experience has been that it is better to remove an impacted third molar than to remove the second molar and trust to the third molar's erupting (with or without orthodontic aid) into the place of the second molar and duplicating the function of the second molar in masticating food. I also believe the best practice is to remove the third molar crown before the roots have formed.

Fig. 1 shows radiograms of an orthodontic case in which I advised extraction of the crowns of the mandibular third molars. You will notice that there is not room for these two teeth to erupt. It was in an extreme Class Two, Second Division Case (Angle). The

patient was wearing appliances to develop the arches, and intermaxillary ligatures to move the mandibular teeth forward. As he was leaving to attend school at a distance, the operation was delayed.

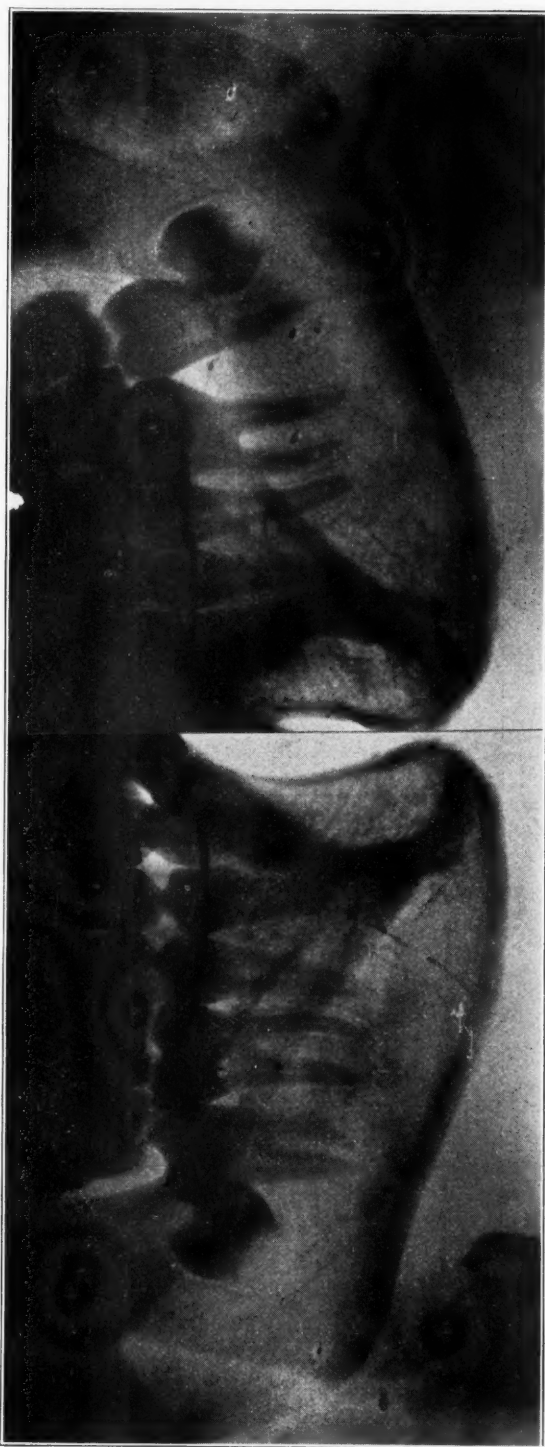


Fig. 1.

Radiograms made one year and a half after the first (Fig. 2) show that arch development has taken place, making room back of the mandibular second molars so that

the third molars are about to erupt normally. These radiograms also show that the maxillary third molars are absent.

I have another case (First Division of Class Two—Angle) in which the right man-

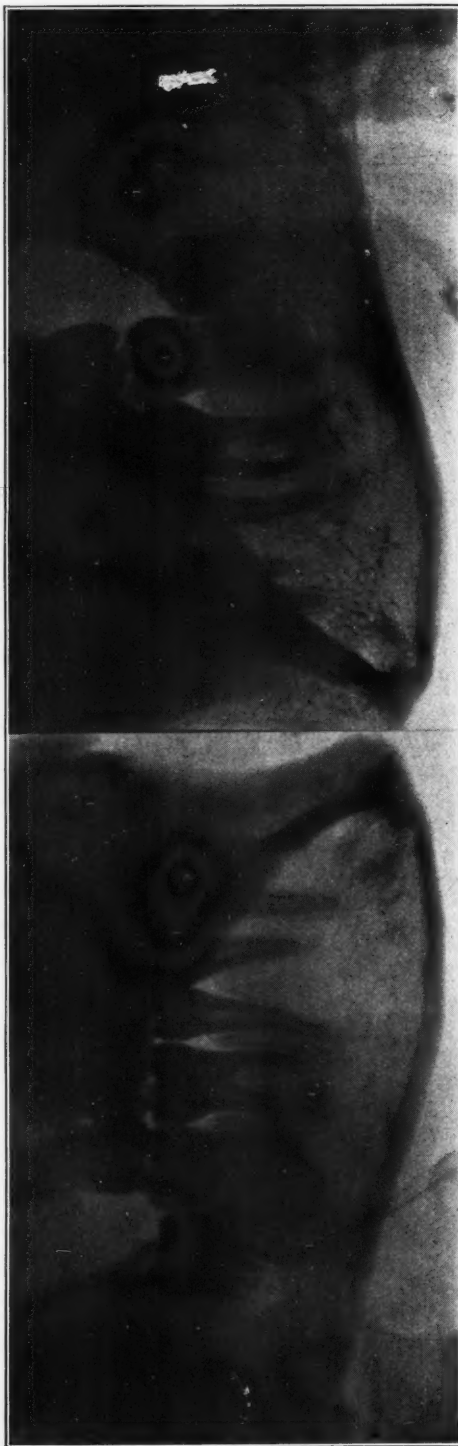


Fig. 2.

dibular third molar was congenitally absent and the left badly impacted. In treating this case the mandibular arch was developed so that the impacted left third molar assumed a normal position.

I am citing these cases to show that in young patients there is a possibility of securing sufficient arch development to relieve third molar impactions.

Dr. Harold Chapman, London, England.—It seems to me, the paper of Dr. Barnes has impressed on us the difficulty in certain cases of getting sufficient development of the maxilla and mandible to accommodate all the teeth. I may remind you that the growth of the mandible from between three months and eighteen months is about 100 per cent, and it is also considerable up to the fifth year, but from two to five years the growth is the same, or rather more than it is between five years and twenty. So, it appears to me, Dr. Barnes' paper impresses upon us the necessity for very early treatment, and unless we begin treatment extremely early, it is almost impossible to get the growth and development which is necessary in order to make room for all the teeth. In this connection it is not only the maxilla and mandible which are concerned, but other bones in association with them, and I may especially refer to the sphenoid and temporal bones. Of course, you know they articulate with the jawbones, and unless we can also influence these other two bones with the mandible and maxilla, we shall not be getting the best results from treatment. This point was brought out recently in a paper, which I referred to yesterday, by Sir Arthur Keith in which reference is made to the masticatory phase in all our treatment. We have to consider the possibility of getting development early. Referring to Dr. Casto's slides, they were exceedingly interesting, but the cases which he showed did not seem to be of the same type as those of Dr. Barnes. Most of them were younger, and in several of them the temporary teeth were present. There were spaces between the first premolar and first permanent molars. They followed first, allowing the molar to move considerably forward, and I take it, Dr. Casto was of the same opinion because he said he removed the appliance. His object was to allow the first lower molar to move forward. I have encountered that difficulty several times in allowing the molars to come forward, and yet obtained expansion of the arch. I have dealt with it by giving these patients a removable appliance which they only wear a portion of the twenty-four hours. I believe that is sound treatment, as proved by the slides which Dr. Ketcham showed.

I wish to compliment Dr. Barnes on his excellent paper which I enjoyed very much. I also wish to compliment him on the excellent series of slides.

Dr. Barnes (closing).—I appreciate Dr. Casto's remarks and the opportunity he gave me of showing him the casts, radiograms, and some of the patients whose cases are here reported.

I had to undertake a course of treatment in these cases illustrated, which I disliked very much; but I felt compelled to do so because it seemed the lesser evil, and there appeared to be no other solution.

Dr. Kecham's discussion and his slides are helpful.

In his second case I believe the second radiogram showed improvement when the boy had returned, the third molar had erupted, but the mandible was much longer than it was in the previous radiogram, a longer growth than one year could have made. The radiograms evidently were not taken at the same angle.

I have had great difficulty in obtaining good radiograms.

I call for a large external radiogram every time, and measure with dividers from the angle of the jaw to the symphysis, measuring patient's face and the radiogram. These must agree within less than one-eighth of an inch.

Apparent impaction can be shown by radiograms taken at a wrong angle.

I have radiograms in my office at the present time that show almost unbelievable changes in development, with orthodontia; but the cases are not finished.

I hope to be able to show further radiograms of these reported cases in a year or two.

I appreciate more than I can tell, the close attention which you gave my dry and too lengthy paper, and I hope you will take it as a study, adding to what I have here given.

DEPARTMENT OF ORTHODONTIC TECHNIC

Edited By
H. C. Pollock, D.D.S., St. Louis, Mo.

ELEMENTARY ORTHODONTIC TECHNIC

By H. C. Pollock, D.D.S., St. Louis, Mo.

(Continued from July issue.)

THE RIBBON LABIAL ARCH WIRE (CONTINUED)

A PREVIOUS article of this series follows the evolution of the labial arch wire to the more delicate device which we are fortunate in having at this time, as exemplified in the small and efficient ribbon flat wire, heretofore mentioned.

There seems to be no question but that this appliance has deservedly become highly popular among a great many orthodontists, from the standpoint of merit and efficiency. Some of its most vigorous advocates, however, in their enthusiasm and praise of this device, have obviously carried their ardent zeal up to a point of morbidity. Not unlike all things or devices new in science, the first burst of enthusiasm is usually discounted subsequently when there has expired ample time for reflection and practical experience. It is to be remembered, however, that the controversy over the relative merits of orthodontic appliances is "the focal point" where, as Simpson has so aptly expressed it, "the orthodontic lamp of knowledge splutters, and the diversity of methods and harangue over nonessentials is confusing in the specialty" at this time, and has been in years past.

It can be said, however, without successful contradiction, that the ribbon labial wire with its efficient and delicate mechanical attributes has won for itself a most conspicuous place in the practices of many orthodontists throughout the world; and in the hands of the experienced and seasoned operator, it proves a distinct advance in technic for the treatment of many types of cases.

LIGATURES

Wire.—Wire ligatures are manufactured in three sizes, usually large (about 24-gauge), medium, and small (about 28-gauge). In the past, wire ligatures have exerted a very marked influence upon the development of orthodontic technic, being a simple means of applying pressure to a tooth as well as being clean and sanitary. The wire ligature is placed about the

tooth to be ligated, one end extending freely above the labial arch wire and one end below. The two ends are then crossed and twisted with the fingers, augmented by a further twist with the pliers. Several types of pliers have been designed for the express purpose of twisting the ends of these wire ligatures.

After the ligatures are twisted, the free ends are cut off and tucked neatly under the labial arch wire in order that there may be ample protection to the soft tissue of the mouth. Wire ligatures are made of a soft annealed brass, as well as of gold. A few operators have used silver suture wire for this purpose. The habit of at all times twisting the wire ligature in the same direction (clockwise) will be found most convenient in subsequent adjustments of the wire ligatures.

Grass Line and Silk Ligatures—Grass line and silk ligatures have been used extensively, inasmuch as they have the peculiar characteristic of contraction after having come in contact with the saliva of the mouth. This contraction continues to be manifest for many hours after the ligature has been tied to the tooth. On account of the above characteristic, they can at times be utilized to great advantage in the rotating of teeth by making a reversible loop entirely about the tooth. There is quite a knack in the tying of knots in fibrous ligatures, which has been demonstrated by Ruckstuhl, and which, when understood, increases the efficiency of fibrous ligatures in no small degree. On the other hand, there is serious objection to the use of this type of ligature. In contact with the fluids of the mouth it becomes decidedly septic and unclean, and when in contact with the gingival tissue, always sets up inflammation.

The use of wire and fibrous ligatures for orthodontic purposes, judging again from the customs and practices of many operators, is decidedly on the wane, and they are being replaced by the more stable and secure types of attachments to the teeth, as well as by the finger spring contacts and pushing or leaning action of finger springs, which have many times been described in various literature under the head of lingual appliances.

Rubber Ligatures.—Rubber ligatures are used chiefly for intermaxillary anchorage purposes, in the event it is desired to exert pressure simultaneously between the upper and lower dental arches.

APPLICATION OF FORCE BY MEANS OF THE LABIAL ARCH WIRE

In reviewing the current orthodontic literature, a digest of some of the fundamentals of the application of force seems to be rather pointedly expressed in McCoy's work on Orthodontia, and it seems appropriate here to quote the following:

"It is essential to compute definitely the magnitude, direction and points of application of the force to be delivered and as 'action and reaction are equal and opposite' establish a basal anchorage furnishing a degree of resistance greater than that offered by the teeth to be moved.

"This principle while applicable to a large number of cases must be modified to meet conditions where teeth used as anchorage must themselves

be moved which necessitates a more careful and analytical consideration of the manner, application, direction, and control of the applied forces.

"In the application of these principles, several factors govern the manner in which they are to be used, such as the number and character of teeth to be moved, the extent of such movements, the character of movement desired, and the condition of dentition. Different degrees of resistance are obtained by the selection of 'anchor teeth' whose larger size or more favorable location furnish resistance greater than that offered by the teeth to be moved; or by the selection of groups of teeth, the aggregate of which supply the necessary basal anchorage, or by the manner of attachment to such teeth which may be effected in a way to give them the maximum of stability; or by the reaction of forces reciprocally between teeth or groups of teeth so that they may receive the force equally or unequally according to the needs of treatment."

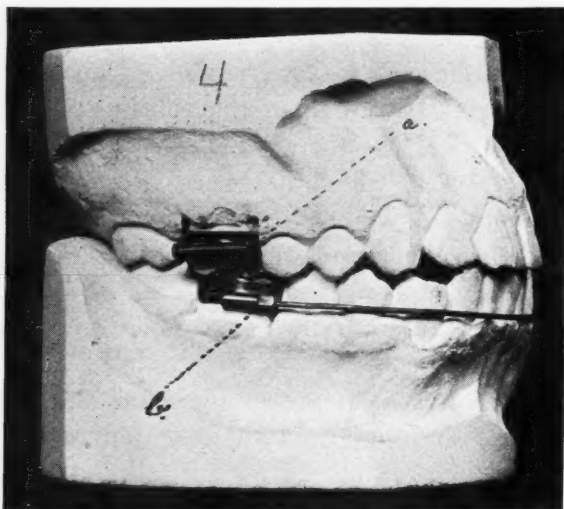


Fig. 29.—Anchorage in simple terms. The molar must show more resistance to force than the anterior teeth ligated.

An example of anchorage in its simplest form is shown in Fig. 29. By way of illustration, suppose it is desired to move the four lower anterior incisor teeth in the labial direction by means of pressure exerted thereto by the labial arch wire. There must be greater potential resistance of the molar anchorage, then, at B than is exerted simultaneously by the resistance of all four incisors when they are ligated to the labial arch wire. If this is not provided for, the molar will move when pressure is applied and the incisors will remain stationary.

In order that the force of any orthodontic appliance may be intelligently applied, then, it may be seen that the question of anchorage becomes one of the utmost importance. A broad perspective of this highly important subject may be secured by the earlier writings of Angle, those of Dewey, Case and Pullen, all of which have been published in book form, from time to time.

(To be continued.)

DEPARTMENT OF ORAL SURGERY AND SURGICAL ORTHODONTIA

Under Editorial Supervision of

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FOCAL INFECTION OF DENTAL ORIGIN AND PRINCIPLES GOVERNING ITS REMOVAL

WILLIAM LETE SHEARER, B.A., M.D., D.D.S., F.A.C.S., OMAHA, NEBR.

IN considering focal infection from the viewpoint of the oral surgeon, the following three hypotheses will be considered: 1. That it is accepted as axiomatic that the principles of focal infection apply to numerous disease conditions such as acute and chronic arthritis, certain acute and chronic nephritides, certain neuritides, myocarditis, endocarditis, myositis, certain gastric and duodenal ulcers, cholecystitis, etc.; 2. That organisms with selective localization properties commonly reside in the diseased processes involving the teeth and jaws; 3. That often the existence of such dental foci have been demonstrated and their removal decided upon. After adequate study of the general disease problem such surgical procedures must be instituted as will give assurance of the complete removal of the foci in question.

My discussion has to do merely with the diagnosis of the existence of such foci, with the estimation of their character and extent; and with the proper methods for their removal. I wish, however, to emphasize in passing, the extreme importance of the general diagnostic problem involved. Much of the disrepute into which extensive dental removals has fallen is due to incomplete study of the patient's general disease problems. The same care should enter into the decision to remove a mouth infection as is accorded the decision for a major abdominal operation. An extensive removal of mouth infection should never be embarked upon without intensive study of the patient, including a complete physical examination and whatever laboratory tests that may possibly afford information of value.

During the progress of disease of the investing tissues of the teeth in the form of pus pockets along the side of the roots, or chronic alveolar abscesses, there is a continuous inflammation of low degree and almost constant supuration, and the pus formed usually is itself undergoing putrefactive decomposition through the growth of the saprophytic organisms.

Foci of infection in the mouth are in the same causal relation to arthritis, endocarditis, nephritis, cholecystitis, etc., as are infected tonsils or chronic suppurations in any other site in the body, whatever variation in degree may possibly exist.

Focal infection, or sepsis, is without any exception the most prevalent infection operating in medicine and a most important and frequent cause and complication of many so-called medical diseases. Its ill effects are wide spread and extend to all systems of the body.

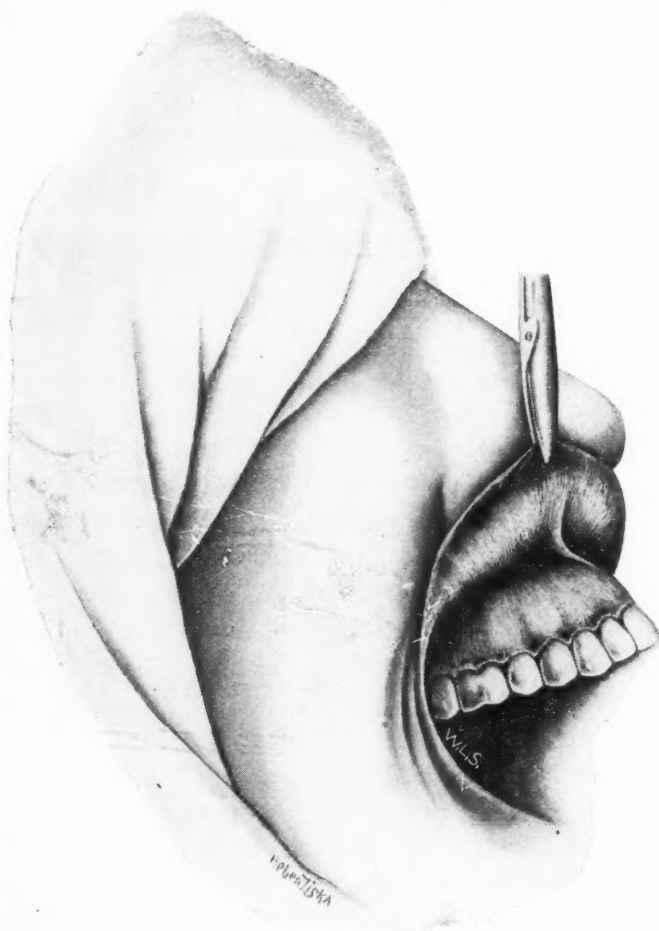


Fig. 1.—Diagrammatic of the superior maxillary. Assuming that the pathology of the teeth and body of the jaw requires the removal of all the teeth.

Figs. 1, 2, 3 and 4 illustrate the complete external alveolectomy.

The relations between these effects and the infection that causes them are constantly overlooked because the existence of the infection is itself overlooked. For one of the chief seats of that infection is in the mouth, and the sepsis itself, when noted, is erroneously regarded as the result of various conditions of ill health with which it is associated, not as it really is, the important etiologic factor.

The effects of sepsis are not the same in all classes any more than are the effects of septic infection in surgery or those of tuberculous infection in medicine. They affect sometimes one system and sometimes another, in different degrees,

depending upon the individual susceptibility, just as a chronic tuberculous infection may, in one case, affect the glands of the neck and in another the joints, the lung, the peritoneum, the meninges and so on. Also at times it may affect all these systems.

The *storm center* in all dentoalveolar disease is the pericemental membrane. The membrane is detached from the cementum by suppuration and is the important factor in establishing the chronicity so characteristic of mouth infection. As a result of infection, the cementoblasts which overlie the surface of the cementum within the pericemental membrane are also

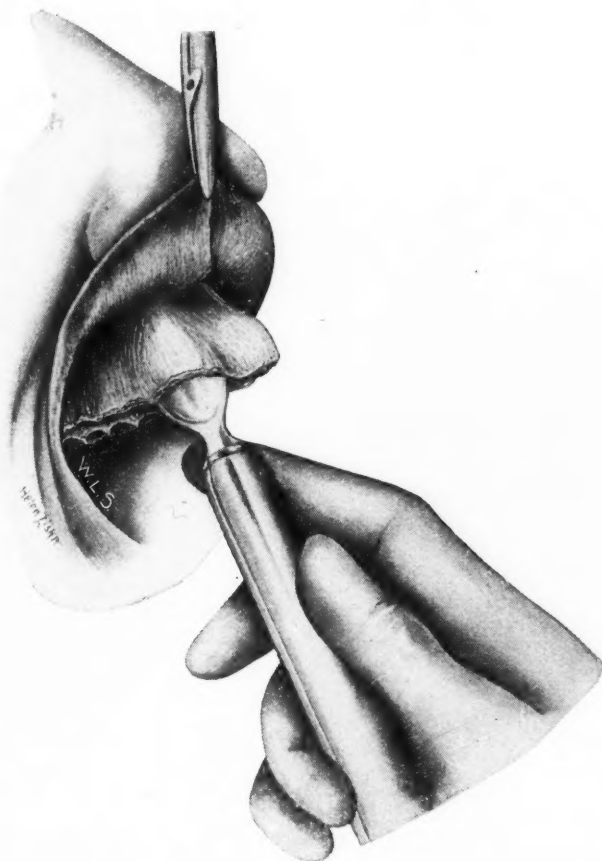


Fig. 2.—Illustrates case after the removal of the teeth, the mucoperiosteum denuded from the bone and lifted upward and above the root ends of the teeth.

destroyed. These are the only cells which can bring about reattachment of that tissue to the tooth and the socket. With the death of these cells, the life and usefulness of the teeth are limited. Soon after detachment, the fibers of the pericemental membrane which formerly passed from the cementum of the tooth of the detached area to the alveolus, disappear, and a little later this bone to which these fibers were attached, is absorbed. Thus, in addition to the fact that the denuded cementum is dead, all of the specialized elements necessary to the connection of tooth root with adjacent bone are lost and a reattachment of this tissue to the cementum of the root cannot take place. (In other words, the tooth has permanently lost contact with the

alveolus.) Therefore, pockets persist about such teeth and are subject to continuous reinfection. In many cases healing is only apparent and not a reality, while in the case of the chronic alveolar abscess the chronicity may be maintained by the dead pulp of the unfilled or filled root canal, or by the denuded cementum about the end of the root. If the cementum has been detached, the condition is practically the same as the pus pocket which is open at the gingival line, so far as the continued chronicity is concerned, as there is no possibility of a reattachment. The presence of such a focus does not indicate that the person is suffering from systemic effects, but it is potentially dangerous. This is a question of the resistance of the tissues or of individual immunity.

On the other hand, it should be remembered that the definite secondary

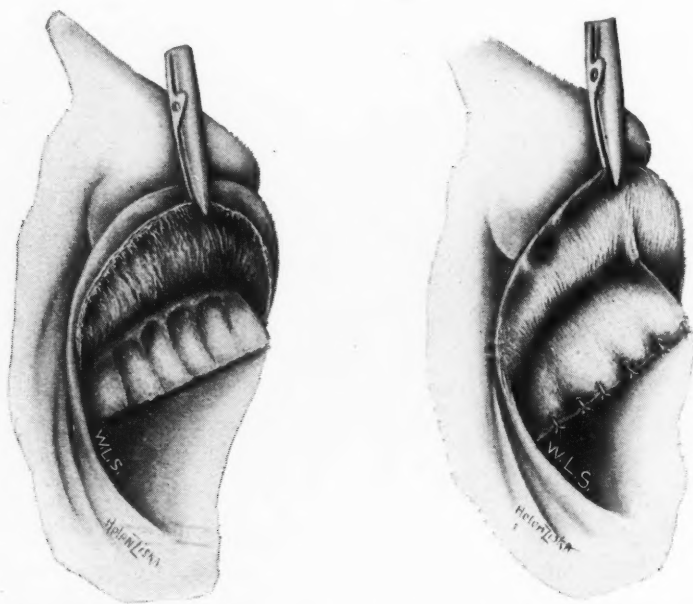


Fig. 3.—The mucoperiosteum reflected up to the root ends of the teeth and the external alveolar plate along with diseased tissue attended to under the eye. The lingual, buccal, gingival mucosa trimmed. No jagged bone edges are left.

Fig. 4.—The mucoperiosteum carried back into position and sutured with horsehair. I advise continuous horsehair suture in the hands of those experienced, either buttonhole or over and over stitch.

lesions resulting from these foci are of such gradual onset that they are occasionally not recognized by the patient, and do not come to the attention of the physician until they have made such progress as to be incurable or, at least, very resistant to treatment. Theoretically, this fact demands the eradication of the foci for the protection of the health of all persons whether apparently suffering or not. But teeth are useful and cannot be sacrificed with the same sang-froid with which we delete the tonsils. Therefore, we often feel that it is the part of wisdom to advise patients in good health to take a chance and hang on to necessary teeth, though these teeth may show evidence of indolent infection. This does not apply, however, to extensive infection involving many teeth and showing widespread destruction of the

alveolar process. Nor does it apply to patients showing definite symptoms traceable to foci of infection.

Any new procedures which tend to depart from the old, however inadequate the old may be, are not usually met with much enthusiasm; on the contrary, it is the rule that they are accepted slowly. It is not easy for men who have been doing things a certain way, teaching and advocating certain methods to renounce them, much less admit the fallacy in the things they have been teaching and doing. We are all prone to meet progress



Fig. 5.

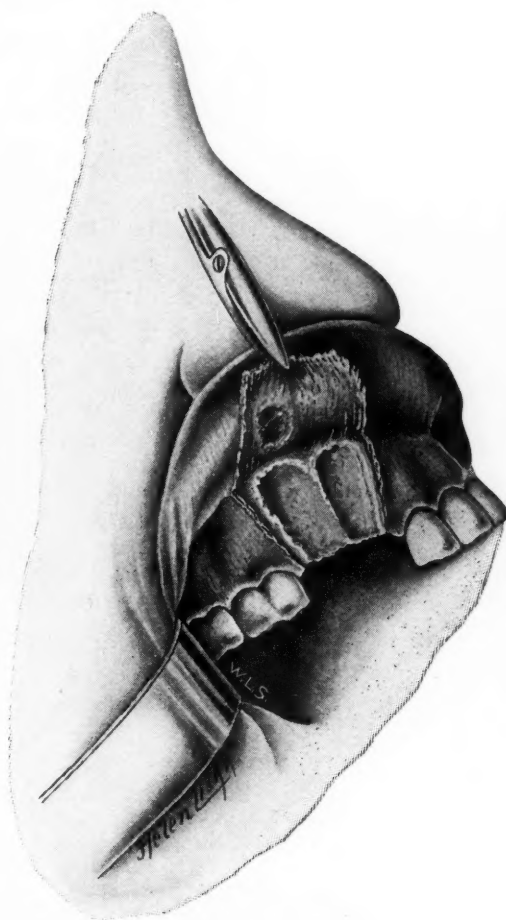


Fig. 6.

Figs. 5, 6, and 7 illustrate partial external alveolectomy.

Fig. 5.—Shows conditions of the bone often revealed after the flap is laid back, the granuloma attached to the mucoperiosteum. It is necessary in many instances to employ the knife in order to remove the diseased tissue.

Fig. 6.—Partial external alveolectomy ready to close.

reluctantly, especially if it demands that we stop doing things in the manner in which we have been doing them, and as we grow older we are likewise reluctant to take up the new, even though we are able to see its application and its true advantages. This is all too human. (With apologies to Nietzsche.)

It is difficult to accept the obvious. We all see the trend of the times in preventive medicine, yet we do not accept and apply it to our daily practice. Not until it has been forced upon us by the truth of its application

will we accept. So does habit of mind determine our attitude to mouth infection. Focal infection as a cause of, or a contributing factor to remote disease is an established fact. The careful work done by many throughout the country notably Billings, Rosenow and coworkers, has proved this.

Less serious attention seems now to be given the teeth and jaws in their

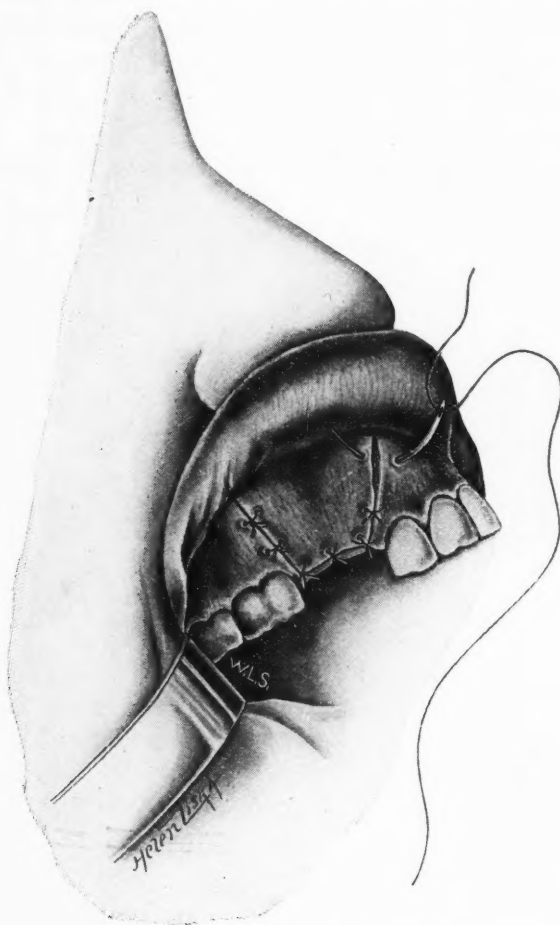


Fig. 7.—Replacement of the mucoperiosteal flap into proper position.

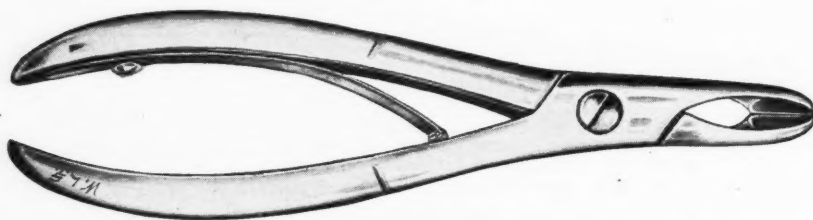


Fig. 8.—Special rongeur forceps designed to better carry out certain steps of this class of surgery. Presented to the profession for what it is worth.

relationship to disease problems than was given a few years ago. Failures and disappointments in large numbers of cases probably furnish a reason for this attitude of inactivity on the part of many. Improper evaluation of the factors entering into the problem doubtlessly may be a cause for unhappy results.

Figs. 9, 10, 11 and 12 illustrate different stages of the operation for the removal of imbedded and impacted teeth lying in the roof of the palate distally to the roots of the teeth.

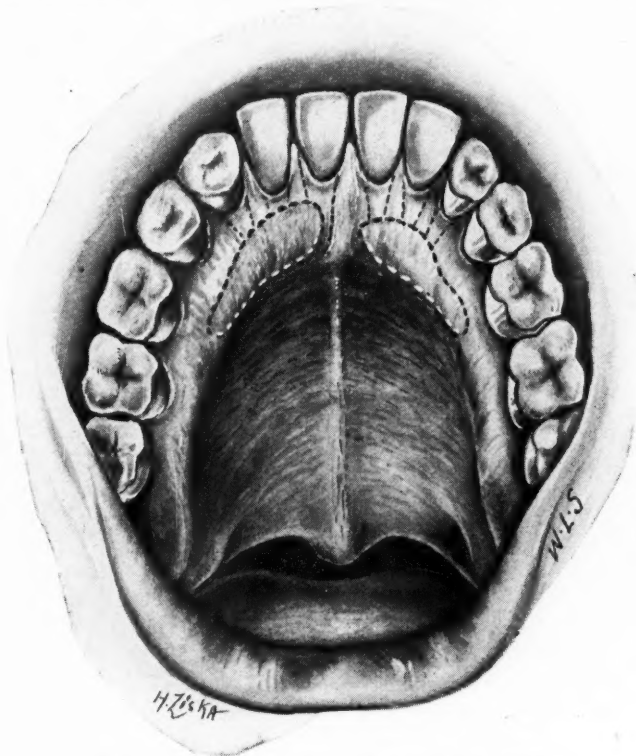


Fig. 9.—Diagrammatic of imbedded cuspid.

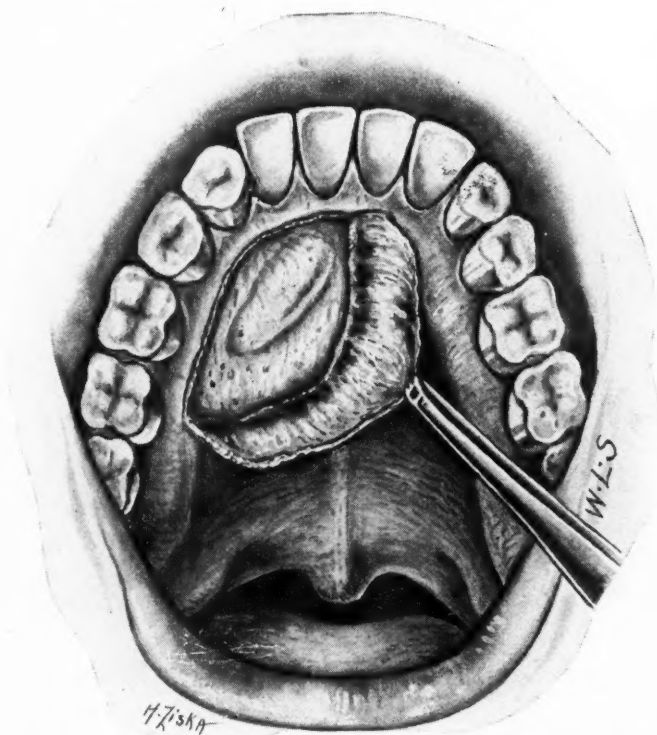


Fig. 10.—First step in operation. Incision is made close to the teeth, leaving just enough mucoperiosteum to suture to. This incision involves only the terminal branches of the descending palatine artery and thereby avoids excessive hemorrhage.

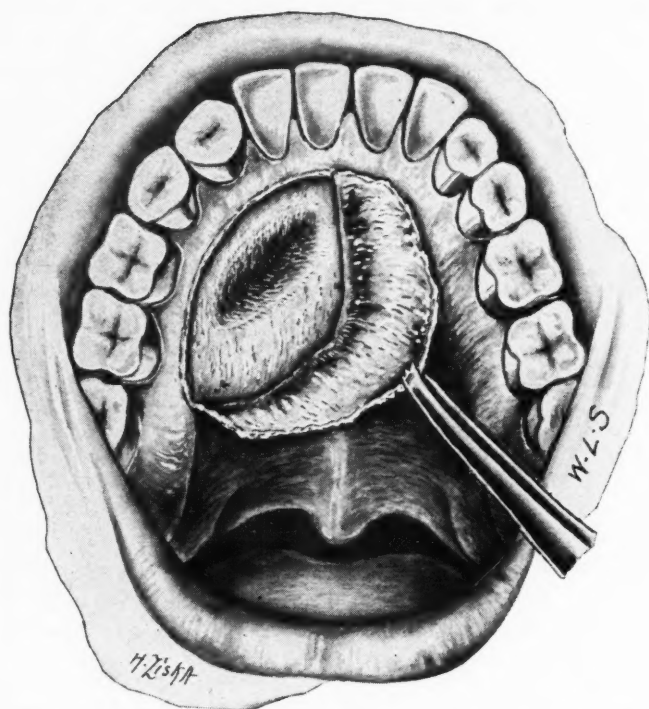


Fig. 11.—Illustrates the condition of the bone trimmed and smoothed, leaving no jagged edges after the removal of the teeth.

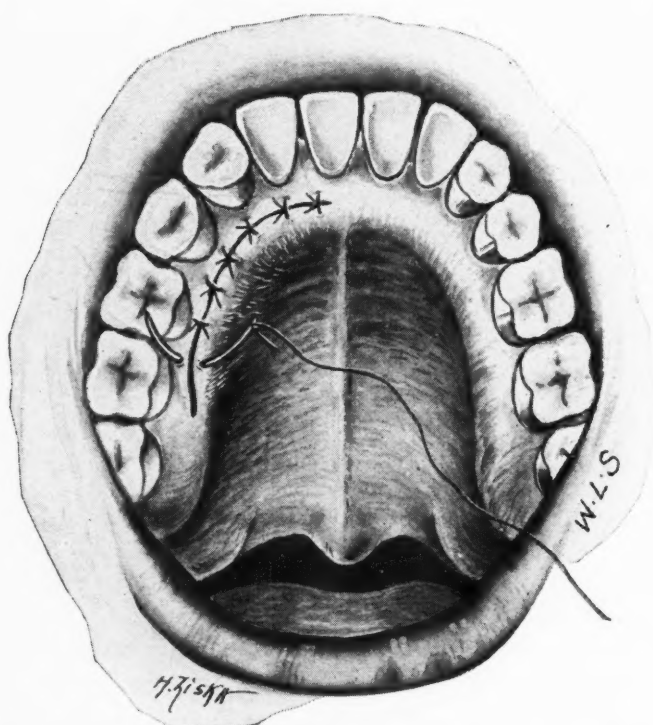
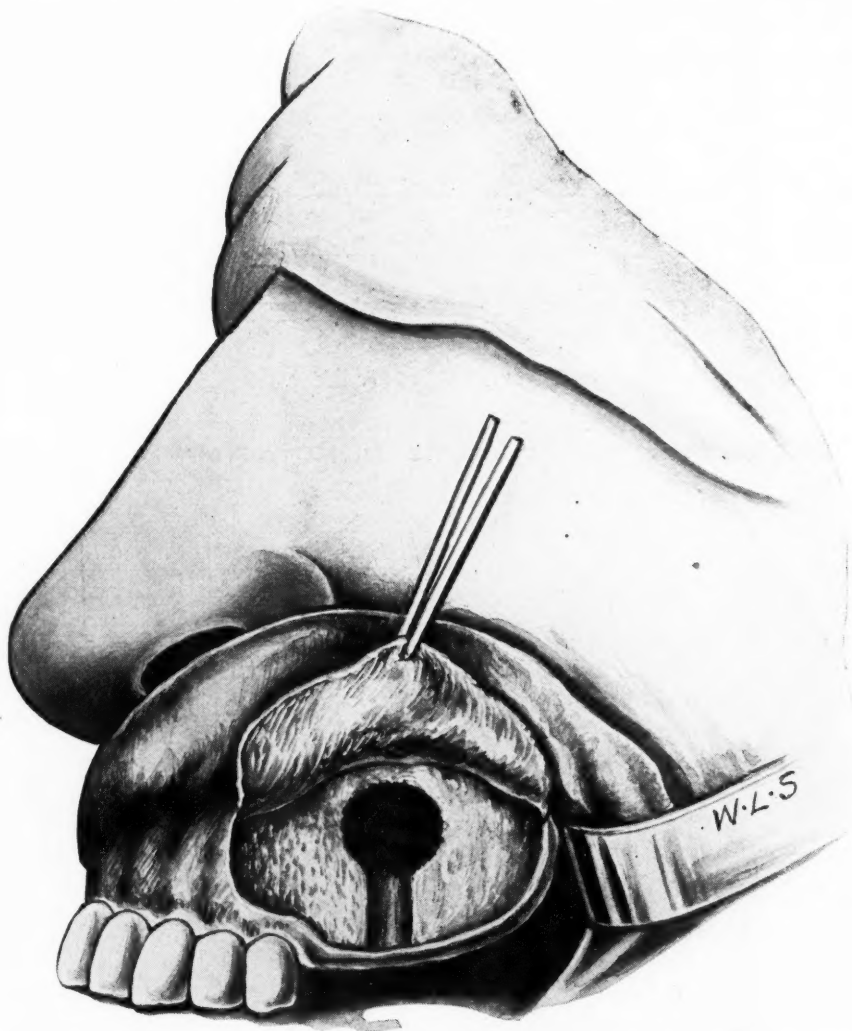


Fig. 12.—Closing of the mucoperiosteal flap with horsehair. With this technic there is no depression in the palate and usually no sloughing.

Inadequate surgical technic in removing mouth pathology, (diseased bone contiguous to root ends of nonvital teeth, pericemental membrane, etc.), is one of the great causes for failure to obtain decisive results. It is then incumbent upon us to change our methods of treating bone disease of the jaws. The least that the oral surgeon can do is to get rid of the disease. If he fails to do this, it may be very unfortunate for the patient. It would seem to me that the lantern demonstration which follows should establish this



Figs. 13 and 14 illustrate steps in method of approaching the maxillary sinus, where there are one or more teeth removed. In this way an ocular observation of the maxillary sinus may be had. A small groove is chiseled in the body of the bone, which permits of drain plug. When the patient recovers there is scarcely an indication of an operation having been performed.

contention, the whole purpose of which demonstration is to show what mouth disease is, how it may be recognized, and finally, how it may be removed.

Anatomical Problems.—The embryologic development of the jaws and the subsequent growth of the jaws after birth is an intensely interesting study, but cannot be taken up in this paper other than as it pertains to the pathology of infection and to technic.

Suffice it to say that the alveolar process develops as the teeth develop and take their relative position in the jaws, and that when the teeth are lost or lose their function, resorption of the alveolar process, wholly or in part, inevitably follows.

It may be of interest at this point to state that while the growing tooth germs are producing pressure which is transmitted to the cortical plates,

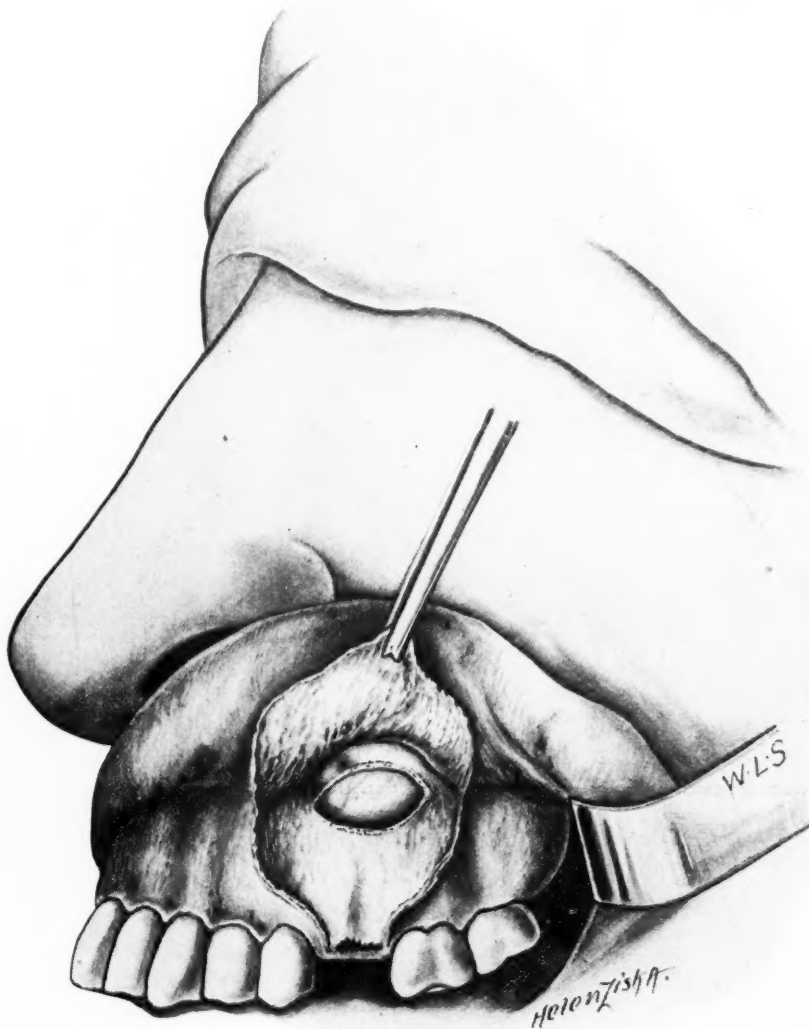


Fig. 14.—Shows flap sutured back in place with interrupted horsehair, a few stitches omitted at the site of drainage.

the growth of the tissues within the mouth, the tongue and the associated organs are exciting pressure upon the lingual surfaces of the bone. The muscles attached to their surfaces transmit force to the bone through the peritoneum, and the functions of mastication, deglutition and respiration are acting upon them. All of these are mechanical stimuli to which the connective tissue cells respond. In all the process of development the growth is the result of all the forces to which the bones are subjected, perfectly dis-

tributed through the substance of the bone by the agency of normal occlusion. Any lack of harmony in the proportion of these forces may allow the teeth to meet when they erupt outside of the normal influence of their cusps, causing the beginning of malocclusion, (and possible subsequent disease).

The peridental or pericemental membrane may be defined as that tissue which fills the space between the surface of the root and the bony wall of



Figs. 15 and 16 illustrate an operation designed to remove the bony floor of the maxillary sinus when diseased, such as a chronic osteomyelitis, leaving the mucous membrane intact. First step.

the alveolus, and supports the gingivae. In a sense it is the most important tissue to the dentist, for upon it the usefulness of the teeth and their comfort to the individual is dependent. It makes no difference how perfect a crown may be, or how perfectly any damage which may have occurred to it may have been restored, unless the pericemental membrane is in a healthy

and fairly normal condition, the tooth will be temporarily useless and the individual would be much more comfortable without it.

The relation of disease at the root ends of teeth contiguous to the maxillary sinus is of paramount importance. Maxillary sinus disease caused by the infection from the teeth is more common than is usually recognized.

The diseased bone in proximity to the sinus is one of the important fac-

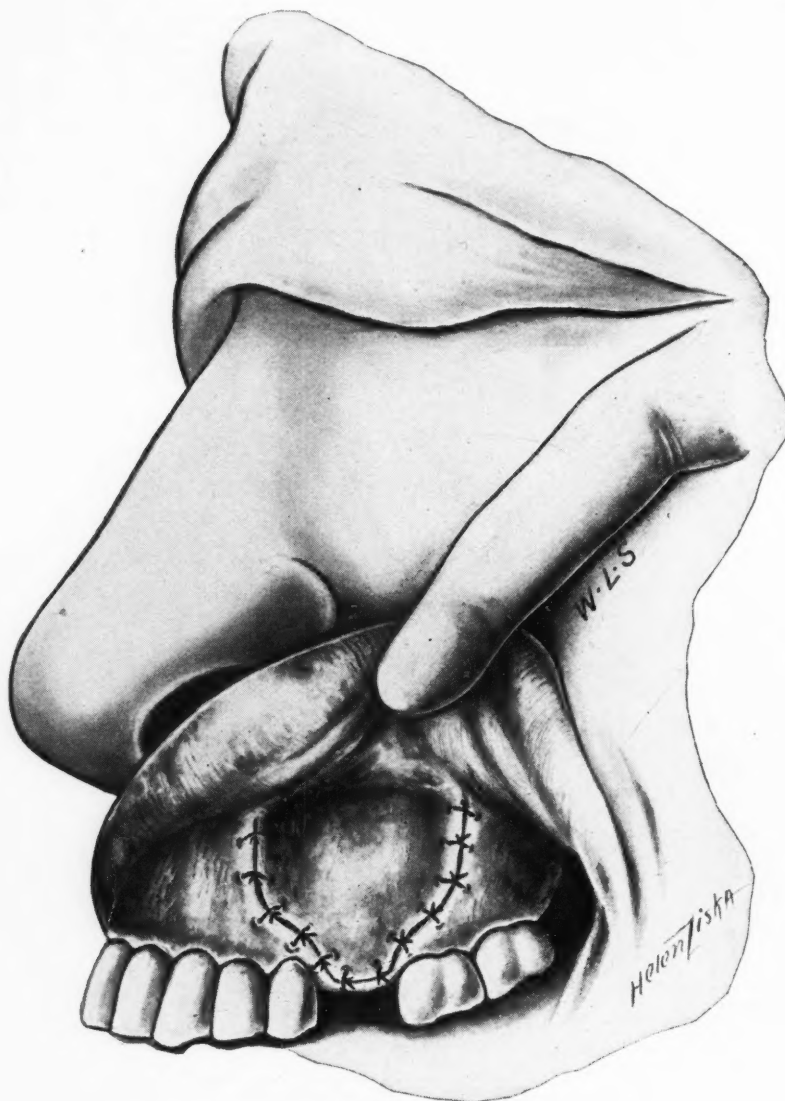


Fig. 16.—Operation completed.

tors which should not be overlooked. Attacking sinus disease of dental origin through the nose will not afford satisfactory results. Properly managed there will not be a loss of teeth other than those which are a part of the disease.

Pathologic Problems.—The objective involved in the accomplishment of these principles may be summarized as follows:

Figs. 17, 18 and 19 illustrate steps in the design of an operation for the removal of impacted and imbedded lower third molars.

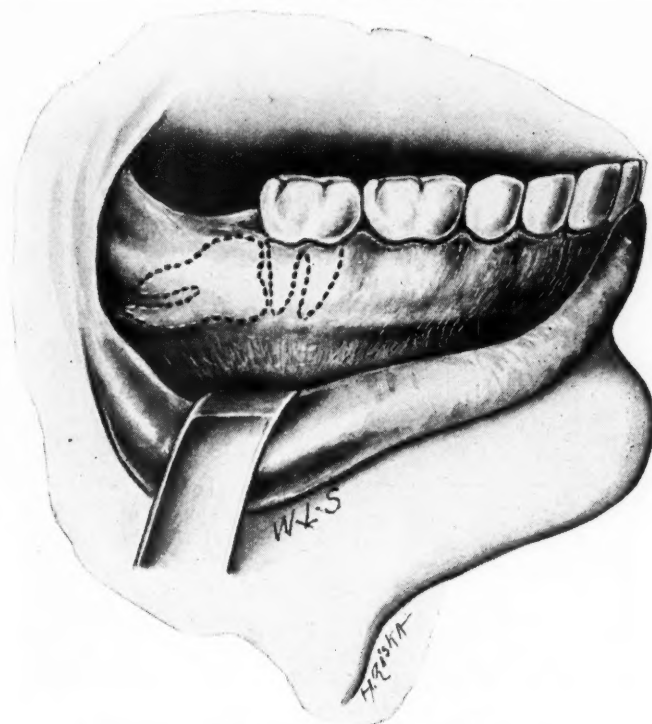


Fig. 17.—Diagrammatic of imbedded tooth.

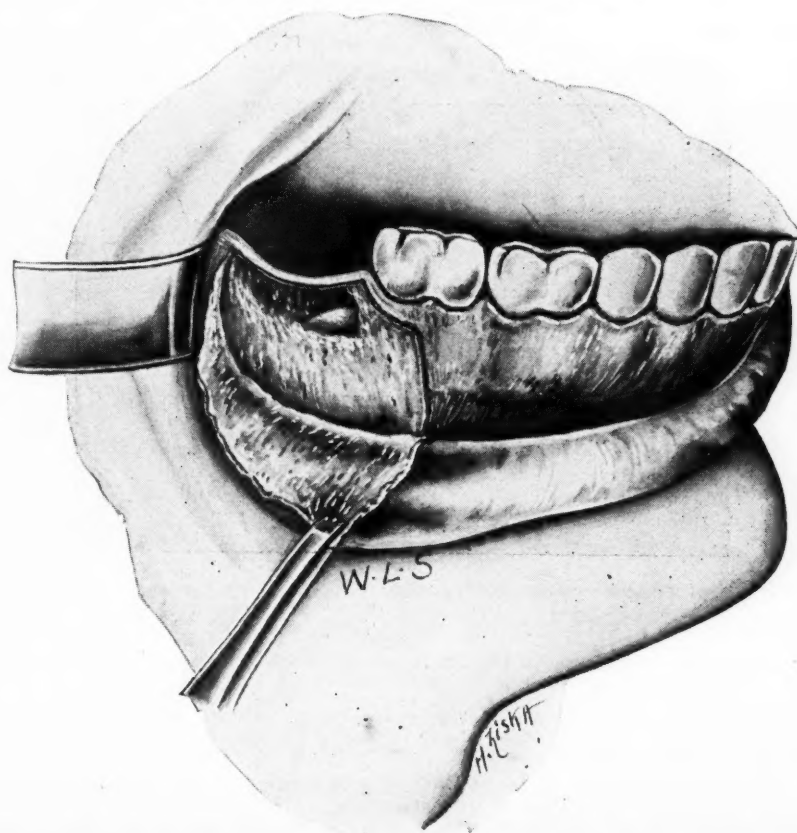


Fig. 18.—First step in showing line of incision.

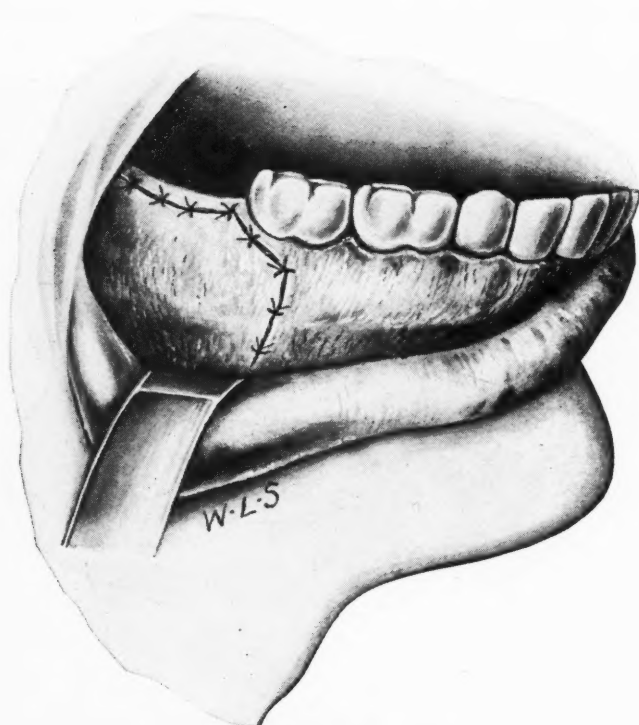


Fig. 19.—Finished operation.

Figs. 20, 21 and 22 show plaster models of sharp alveolar margin found several years after ordinary extraction in patients unable to wear plates. The mucoperiosteum is laid back and this sharp ridge removed with the rongeur forceps. The pain is relieved and plates can be worn comfortably.

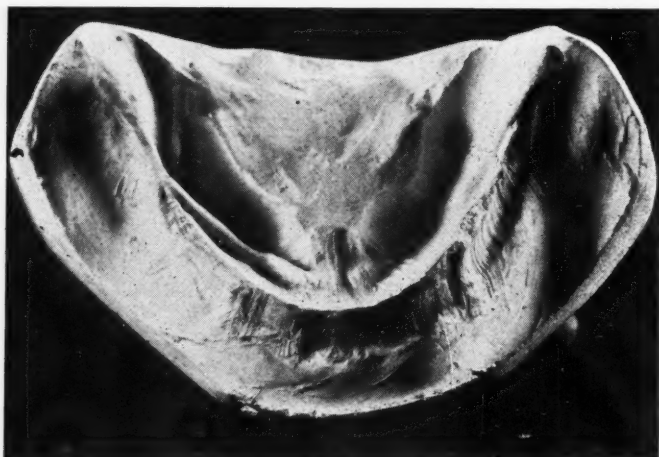


Fig. 20.—Shows very clearly the condition of the ridge of the mandible two years, four months after the universal method of merely extracting the teeth, with no further attention given.

The alveolar process, being a transitory tissue, after the teeth are removed, gradually fades away. In the fading process there is a collapse of the center of the alveolar process and the buccal and lingual surfaces collapse, as it were, like a couple of boards being pushed together, thus leaving a knife edge of very hard, bony process, which is lacking in blood supply. It is this knife edge of bone which accounts for the severe complications so many people have in wearing artificial dentures.

The condition as shown in this model is a condition I have observed after cutting down upon the center of the ridge of the edentulous mandible of five hundred and twenty-seven cases, ranging all the way from one to ten years after the teeth were removed.

- Step 1. An ocular observation of the disease to be removed.
2. The certain removal of the infection.
3. The leaving of the tissues in the best possible condition, no jagged bones, infective granulation tissue, etc.
4. The least possible trauma to important tissues, blood and nerve supply, etc.
5. The collapse of the bone cavity as far as possible.



Fig. 21.—Shows condition of mouth after alveolectomy has been improperly performed. In this case only part of the external alveolar process was removed. If external alveolectomy is properly performed, the internal and external alveolar process should be removed.

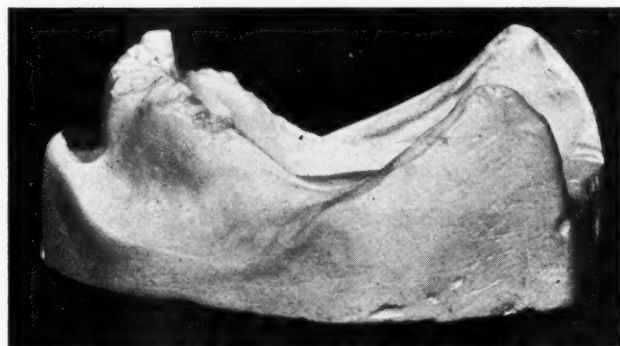


Fig. 22.—Shows clearly what happens to the process a year or so after the teeth have been removed.

6. Irrigation daily of hot salt solution or one half of one per cent lysol solution. Most important are hot irrigations following all mouth surgery, the mouth harboring so many infective pathogenic microorganisms must of necessity require irrigation to keep the parts clean.

The anesthetic of choice, in my hands, is novocain by nerve blocking, for the reason that it affords ample time to give a careful, painstaking service with the cooperation of the patient, practically no shock, etc.

This class of surgery should be done in the hospital where it can be done

in appreciation of those principles well understood by all surgeons. Yet it is difficult to sell this to the profession, to say nothing of the laity. Sterile gauze wrung out of hot water should always be used around the mucous membrane. Moreover, the hospital affords a better working out of the problem and a better evaluation of the disease of the jaws to the gross problem, and greater certainty of effective after treatment.

Complicated Problems.—Involvement of the floor of the maxillary sinus.

- a. Mucous membrane perforated.
- b. Mucous membrane not perforated.
- c. Granulations and diseased bone in proximity to sinus can be perfectly removed.
- d. Neurologic complications.
- e. Cystic involvement of the jaws.
 1. Nonextensive.
 2. Extensive.
- f. Ludwig's angina.
- g. Neurosis following improper surgical technic.

Severe Vincent's infection should always be ruled out. Many severely complicated cases have been reported as a result of this oversight.

Imbedded and impacted molars.

Imbedded and impacted canines.

Restorations.

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DEPARTMENT OF DENTAL AND ORAL RADIOGRAPHY

Edited By

Clarence O. Simpson, M.D., D.D.S., and Howard R. Raper, D.D.S.

THE TECHNIC OF ORAL RADIOGRAPHY

BY DR. CLARENCE O. SIMPSON, ST. LOUIS, MO.

REGIONS IN DETAIL (Continued)

Mandibular Incisor Region

(Continued from page 710.)

Position of Head. Lateral. Incisal plane horizontal. Anteroposterior. Reclined sufficiently for the longitudinal axes of the mandibular incisors to be vertical when the mouth is open for the reception of the film packet.

Vertico-horizontal Angle of Projection. Fifteen degrees below the horizontal.

Modifications. Twenty degrees below the horizontal where the teeth are exceptionally long, or the packet cannot be adapted as usual.

Mesio-distal Angle of Projection. Directly through the interproximal space of the central incisors.

Modifications. Compensation for a marked mesio-distal inclination of the incisors, especially when the roots are divergent.

Placement of Film Packet. Longer dimension vertically. Lower corners slightly bent. Place packet to laterally include equal portions of the canines or first premolars, and incisally to include the incisal edges of the teeth in symmetrical relation to the end of the packet at the angle of projection. Important details regarding the placement of the packet are given in the explanatory description.

Retention of Packet. First finger of patient's right hand placed well below the center of the packet. Patient's thumb rested below the right molar region, and unemployed fingers flexed to avoid obstructing the field. This position is obtained by raising the patient's right arm until the elbow is level with the shoulder, and then placing the retaining hand in the position described.

Spark Gap. 4 to 4½ inches.

Exposure. 90 to 120 milliamperere seconds at an 18 inch target-film distance.

Explanatory Description. The principal difficulty encountered in examination of mandibular incisor region is the satisfactory placement and retention of the film packet, with the accompanying discomfort to the patient.

The pain caused in placing the film packet can to a great degree be avoided by careful manipulation. The customary method of sliding the packet directly downward as far as the patient will endure is unnecessarily painful,

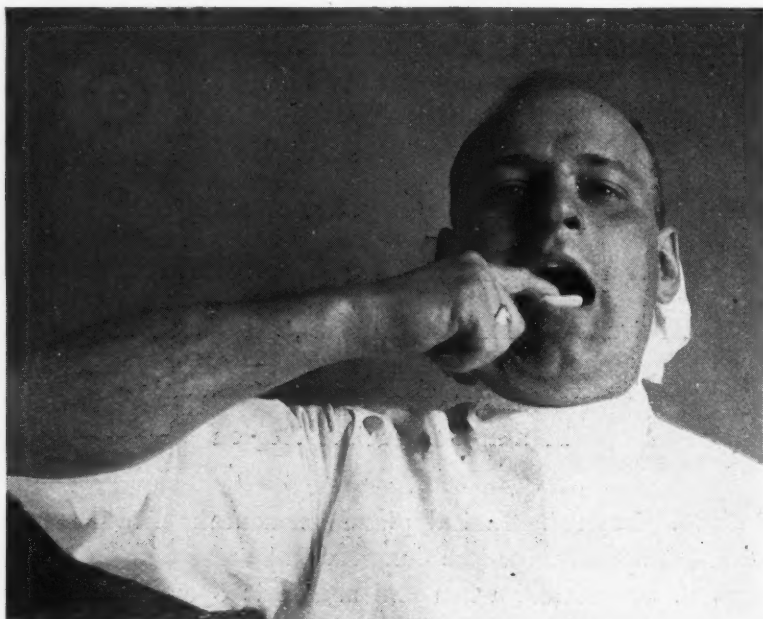


Fig. 1.—Position of film packet and retaining hand for the mandibular incisor region.



Fig. 2.—Position of patient and cone for mandibular incisor region.

and not conducive to the most advantageous placement. In this method the lower edge of the packet is forcibly slid over the attachment of the frenum and muscles, with little opportunity for the tissues to adapt themselves to the unusual intrusion.

The placement of the packet is facilitated by employing three adapting movements. (1) Place the lower third of the packet on the lingual surfaces of the teeth, and adapt it to the curve of the arch. (2) Lift the packet and place the lower two-thirds on the teeth and gingiva with adapting pressure. (3) With the packet removed from contact with the tissues direct it downward and backward under the tongue until the upper edge is the desired relation to the incisal edges of the teeth. Then with the adapting finger placed well below the center of the packet, gently but firmly press it to place. This method gradually conforms the packet in advance, and when the pres-



Fig. 3.—Typical views of the mandibular incisor region. Observe the marginal absorption which would not be accurately shown in a foreshortened view.

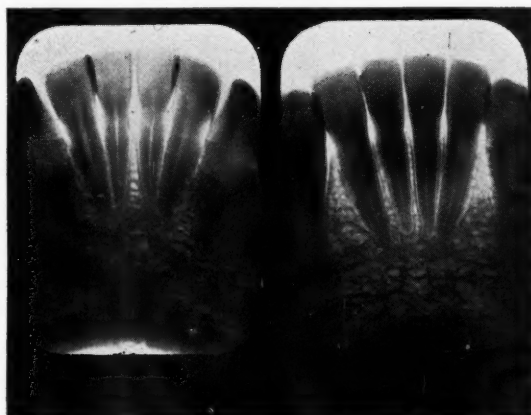


Fig. 4.—Mandibular incisors with convergent roots which are easily examined.

sure is applied for the final adaptation the packet is in a position to displace the soft tissues with the minimum tension.

The retention of the packet and the obstruction by the patient's fingers usually present exasperating difficulties in this region, which can be avoided by the position of the retaining hand and demonstrating the pressure required. In examination of all mandibular regions, the patient should be told that some unavoidable discomfort must be endured for the success of the operation, and the patient should be cautioned not to swallow during the exposure. The latter request should not be made until just before the exposure is begun, to reduce the period of perverse desire produced by the

suggestion. The movement of the tongue in deglutition is most likely to displace the packet, so the effect of the warning justifies the suggestion which increases the desire.

In posing the patient's head so the longitudinal axes of the teeth are vertical, the convexity of the labial surfaces must be considered for the head must be further reclined to have the teeth vertical than just the labial surfaces vertical. Malposition of the mandibular incisors is common, and the mesio-distal inclination of the roots should be calculated in choosing the mesio-distal angle of projection. When an extremely narrow arch or a

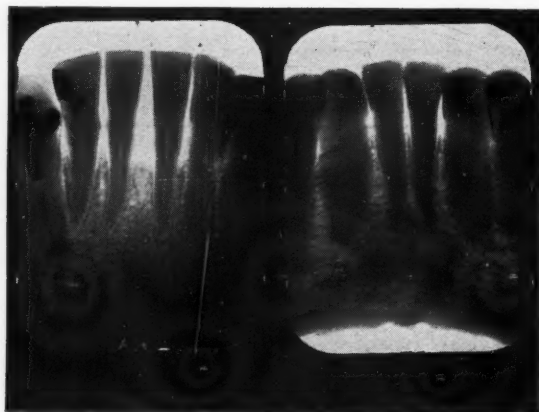


Fig. 5.—Mandibular incisors with roots divergent, which are difficult to clearly reveal in one view.

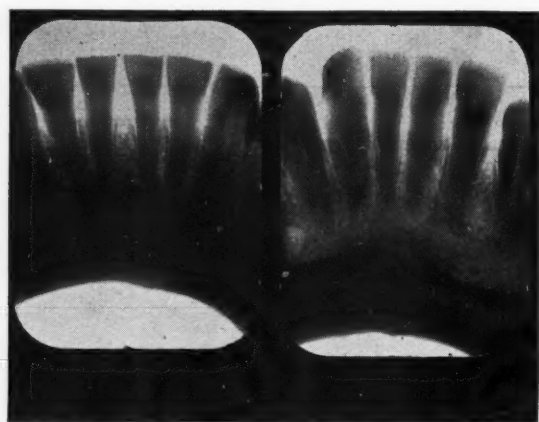


Fig. 6.—Mandibular incisor views in which the mental protuberance is superimposed on the apical area.

marked divergence of the roots will produce a distortion of the lateral incisor images, these teeth may be better viewed in the examination of the canine regions.

Because of the size of the mandibular incisors and the thin alveolar process in this region, operators are prone to reduce the exposure to less than the adequate requirement. Since the mental protuberance may be superimposed near the apical region the exposure should be sufficient to penetrate the entire region although the thinner portions may be overexposed.

WHO'S A RADICAL?

BY HOWARD R. RAPER, D.D.S., ALBUQUERQUE, N. M.

THE other day a dentist said to me, when I advised the extraction of a pulpless tooth, "So you have joined the ranks of the radicals." By radical, my friend meant one who believes in the radical elimination of pulpless teeth. Men are commencing again to label me radical.

In 1913 when I asked for the extraction of pulpless teeth which obviously had much periapical bone destruction, I was called radical. In 1919, I was labeled conservative. A certain dental magazine rejected some of my writing at that time because I was "too antiextraction." And now, 1923, I am again called a radical. I myself have not changed much, as these names have been applied to me, but my surroundings have. It seems then that a man is named not for what he actually is, but for what he is, compared to his environment. [In 1913, it is true that, compared to the aggregate opinion of the profession, I was a radical. In 1919, it is true that, compared to the aggregate opinion of the profession, I was a conservative. And it is true that, in 1923, I commence again to take on the aspect of a radical.]

It looks to me like more harm will be done to human health and life by this reaction against extraction, and in favor of treatment of teeth by inadequate methods, than was done by the extraction orgy of 1919 and thereabouts.

But—even if everybody were as smart and level-headed as I seem to think I am, to judge from what I have just written, still the fact would remain that the only solution to the pulpless tooth problem is to prevent the pulpless tooth.

IN DEFENSE OF THE VOCALIST

"THERE are two kinds of dentists: instrumental and vocal." That is an elderly joke, but a good one I think. It always gets a smile from me. The inference, obviously enough, is that some dentists "do things" while others "just talk about it." The inference goes even further: and presumes that instrumentalists do great good while vocalists do not.

Certainly we could not get along without the instrumental dentists, but the vocalists are not entirely worthless. All radiodontists are, of necessity and to a great extent, vocalists.

The report of the following case indicates how a vocalist might have been of more service to a patient than the over energetic instrumentalist she at first patronized.

A certain middle-aged lady went to a dentist who was, and still is, a one-hundred-per-cent instrumentalist. She had a bridge placed in her mouth

at a cost of forty-five dollars. Within a month she traveled to another city and fell into the hands of another dentist, this time a radiodontist and therefore a vocal dentist.

She had not been free from pain since the bridge had been set and she patronized the radiodontist because she was still in pain. Radiograms of an abutment tooth revealed the fact that it was hopelessly diseased. Of which fact the patient was informed. Fee: three dollars.

Had the patient paid a vocal dentist three or five dollars in the first place, to sing her a little song of advice entitled "Yes, You Should Have No Bridge on That Tooth," she would not have wasted forty-five dollars. Neither would she have endured weeks of useless suffering nor continued to carry an unnecessary risk to her health.

Moral: It doesn't make so much difference whether a man is a vocalist or an instrumentalist. The question is: What kind of music does he make?

RADIOGRAMS

MOST "saved" teeth are like the people saved at revivals—likely to go to the devil later.

* * * *

STICK to the truth and you are almost certain to get into trouble; continue to stick and you are almost certain to get out again.

* * * *

MOST of the dental radiographs being made today are the product of a mixture of laziness, both mental and physical, impenetrable egotistic indifference and a desire to collect a fee. Otherwise they are all right.

* * * *

THE OTHER day I received a letter from a man prominent in dental affairs—and he did not use association stationery, or fraternity stationery, or magazine stationery, or college stationery, nor was he away from home using hotel or railroad stationery. He used his own stationery. This is unusual enough to be worth mentioning.

* * * *

A DIGNIFIED, scientific paper is an interesting story told in the most uninteresting way possible.

* * * *

WHILE preparing a **dignified**, scientific paper the other day I wrote something to the effect that a statement I had just made was not likely to be disputed. For the moment I had forgotten Kells.

* * * *

THE trouble with knowing so much is that so much of what you know isn't true.

* * * *

MEDICINE and dentistry have made many mistakes; but it has never been a mistake to prevent disease or start treatment in the early stages. It cannot be a mistake to prevent toothache.

ABSTRACT OF CURRENT LITERATURE.

Covering Such Subjects as

ORTHODONTIA — ORAL SURGERY — SURGICAL ORTHODONTIA — DENTAL RADIOGRAPHY

It is the purpose of this JOURNAL to review so far as possible the most important literature as it appears in English and Foreign periodicals and to present it in abstract form. Authors are requested to send abstracts or reprints of their papers to the publishers.

Cause and Effect of Malocclusion of the Teeth. L. M. Waugh (New York).
New York Medical Journal and Medical Record, August 1, 1923, cxviii, 3.

Malocclusion should not be visualized as a disease. In normal occlusion each tooth occludes with two others in the opposite jaw, save for the exceptions of the lower central incisors and the upper last molars. In other words each cusp or prominence fits into a corresponding depression on the mortar and pestle principle required for the comminution of the food. When this arrangement is disturbed we have malocclusion. If there is malocclusion of the deciduous teeth, in addition to the insufficient mastication, we have a factor in the imperfect development of the facial and cranial bones. The claim that a child may inherit large teeth from one parent and small jaws from the other is often scouted. It has been shown apparently that a small jaw may develop to a large one if given enough work. At present it seems evident that both factors can cooperate in this matter. It seems certain that at the age of five or six years there should be spacing of the canines and incisors, and if this spacing is not in evidence orthodontia should step in, because lack of spacing means improper development of the jaw. Premature loss of deciduous teeth is an evil, as is also too long retention. In the latter case we have to think of a diseased pulp and its consequences, and deciduous teeth are as apt to cause focal infection as are permanent ones. The x-ray should always show before extraction that a permanent tooth is on the way.

Present Status of the Pulp and Root Canal Problem. M. L. Rhein (New York). New York Medical Journal and Medical Record. August 1, 1923, cxviii, 3.

The author knew something of focal infection as far back as 1879, and a few years later the visit of Lawson Tait to America created a wave of interest in the problem of aseptic surgery. But at this period the equipment even of the best dentists was insufficient to enable them to cope with the new problem and many years had to elapse before the relations of caries

and pyorrhea to systemic disease could be visualized. But other factors of a readily intelligible kind were also operative, such as economic pressure, for much time was required to carry out the technical requirements of root-canal filling. Infinite patience and meticulous asepsis were heavy consumers of time which was reflected further in the cost to the patient of such expenditure of time and effort. The personal equation also figured heavily, for many dentists were not temperamentally fitted for such fussy effort. Furthermore there was a wave of reaction in favor of extraction as a short cut. Wholesale extraction in turn provoked another reaction and naturally the ultimate outcome was a compromise which meant a sort of embalming of the pulps, in which commercialism figures heavily, thereby introducing another complicating element. In the meantime quite another "complex" became active in the form of orthodontia, in which malposition was made the goat of all dental difficulties. Despite the pessimistic outlook at the start orthodontia as a prophylactic and corrective of dental evils has made an astonishingly good record within a small compass of time. In fact the extraction of pulpless teeth is now often only a detail of orthodontia. Nevertheless the treatment of the pulp will remain a special discipline of dentistry. Removal of uninfected pulp ought to be successful in 95 per cent of all cases and after the pulp has become infected this figure is not greatly lowered.

Dentistry and Medicine. L. F. Barker (Baltimore). *New York Medical Journal and Medical Record*, August 1, 1923, cxviii, 3.

The author shows by a series of anecdotes that to the layman a dentist is a surgical specialist, exactly like the rhinologist and otologist. This suggests the query, "Why then is dentistry more sharply segregated from medicine than the other surgical specialties?" The relative independence of dentistry as a calling is no mystery, for its causes are quite obvious. Dentistry branched off from general surgery because of the great importance of prosthetic work. No man who worked in the technics of prosthesis had any time or inclination left to pursue general practice nor is any general physician, surgeon or other specialist able with all of the demands on his time to keep in touch with mechanical dentistry. The dentists were of two camps, one with a medical training who took up dental work, and the other without preliminary training of any kind who learned their calling by apprenticeship. These men are not isolated examples of their kind for we have had optometrists who fit spectacles with no knowledge of the science of optics.

During the past few decades there has been a renewal of the ancient associations between medical practitioners and dentists, the two professions coming in contact in a variety of ways and during this period dentistry has made wonderful strides not due to medical men directly but to the adoption of methods prevalent in the best medical circles, such as raising the standards of education, the use of laboratory research, the use of the x-ray and other diagnostic resources in common use among medical men. At present some subjects have a common appeal to both professions, notably caries and

focal infection, endocrinology and dietetics, and of course the subject of stomatology without reference to the teeth.

Observations on the Existence of Abnormal Physical Conditions as Shown by the Teeth. W. A. Cotton (New York). *New York Medical Journal and Medical Record*, August 1, 1923, cxviii, 3.

The author apologizes for introducing the subject of the existence of dental types due to predominance of one or another of the internal secretions. Thus with an excess of thyroid secretion the teeth are believed to be small, clean, pearly and sensitive, while the subthyroid subject is inclined to have a dirty mouth and caries. The hyperpituitary subject has a well defined type of facial bones and the teeth may be too small for the enlarged jaws. Moreover they are said to be large—especially the central incisors—and square without much caries, the opposed hypopituitary type having small, eroded and carious teeth. In excess of adrenaline in the blood the teeth are yellowish and appear at an early period, while the cuspids are long and sharp. In the converse type delay in eruption is seen. In general, excess of secretion of any of the three types seems to make against caries just as deficiency in one or more secretions predisposes to caries. The other secretions may also play a rôle in the shape and quality of the teeth, but our knowledge is more speculative in this field. In theory with defective parathyroid secretion the teeth should be poor in lime.

The endocrinology of the teeth is bound up to some extent with the subject of diet, for defective nourishment, no less than defective secretions, may determine caries. The defect however may not be in the ailment proper, which in itself may be sufficient for the needs of the cells, but may be the result of some irregularity of assimilation in which the cells themselves are at fault.

Importance of Dental Diagnosis for General Medicine. W. Gildman Thompson (New York). *New York Medical Journal and Medical Record*, August 1, 1923, cxviii, 3.

The doctrine of focal infection and the discovery of the x-ray have done more than anything else to bring medicine and dentistry into harmonious relations. The affections in the genesis of which the teeth are more or less at fault comprise digestive disturbances, malnutrition, neuralgias, cardiac arrhythmia (notably in elderly subjects with pyorrhea), endocarditis, secondary anemia, arthritis and myositis and rarely acute septicemia and pyemia. At the same time these infected teeth may seem in certain patients entirely harmless. The experience of the Mayo Clinic that after operation dental infection may be lighted up, has been employed to advantage by putting the mouth in order before operating. In a patient of the author who had just undergone a prostatectomy a molar abscess formed and a hurried trip to the dentist was made by a patient who by rights should not have left his bed.

Many special problems continue to arise in medical practice such as the rapid deterioration of the teeth in the diseases diabetes and pernicious anemia. These have received insufficient study, for the doctor may leave this part to the dentist and vice versa. But all such opportunities will have to be improved in future, for as Brophy well states we still know less of the teeth than of any of the structures of the body.

Rôle of the Dentist in the Warfare Against Cancer. J. Esteoule (Paris).
La Semaine Dentaire, July 29, 1923, v, 30.

The chief contact of the dentist with malignant neoplasms is with cancer of the tongue and to a less extent he is concerned with other locations of intrabuccal cancer. In the lingual location as well as the others and to a still greater extent do leucoplakic patches play a precancerous rôle. The syphilitic smoker is believed to be especially predisposed to cancer of the tongue and one surgeon, Poirier, found that 84 per cent of cases studied occurred in syphilitics. If the dentist is able, however, to recognize these lesions in the early stages is there any likelihood that they can be arrested or even prevented from developing? The outlook is a gloomy one for none of the newer developments which have occurred in the domain of cancer therapy are of much benefit in cancer of the tongue. But the dentist should not be discouraged. He must continue to warn his patients of the dangers of leucoplasia; and whenever in the course of routine examination of the mouth he sees anything which suggests beginning malignancy he should at once refer the patient to a surgeon for early operation which may prolong his life and even at times be followed by relative recovery.

Dentistry and the Cancer Problem. Editorial in *The Dental Outlook*, August, 1923, x, 8.

The editor asks, "What can the dental profession do in helping to stamp out cancer?" Cancer of the mouth and tongue is common in men and hence is usually associated with the habit of smoking. The cigarette has not been accused as a rule but Bloodgood has pointed out that by the sticking of the paper to the lip a focus of irritation may be started up. Recently surgeons familiar with cancer have addressed dental societies as to the function of the dentist in suppressing cancer. While little that is new was brought out, the responsibility of the dentists to their patients was shown to be heavy. Not only the epithelioma of the buccal cavity but sarcomas of the bones may first be seen by him. The dentist may for the moment liken the man who wanders into his office with incipient cancer to a man in the first stage of smallpox. He should feel the same responsibility towards sending him where he will be taken care of. In a specimen case a man presented himself at the office of his dentist for an extraction. The dentist noticed an ulcer on the tongue which the patient had been told was a diabetic sore.

This diagnosis, it seems, was confirmed later by another general practitioner but later the ulcer developed a profuse hemorrhage and the surgeon who arrested it found that the tongue was cancerous and excised half of the organ.

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EDITORIALS

Dental Laboratory and Orthodontics

IT has been said that a little knowledge is dangerous and probably that holds just as true of orthodontics as of any other subject. From articles and advertisements which have appeared in the trade journals recently, we are inclined to believe that a few dental mechanics and laboratories have obtained a little knowledge of orthodontics and are distributing information to the dental profession in such a manner as to be extremely detrimental and dangerous to the welfare of the public. Some of the statements made by the dental laboratory men in some trade journals are very misleading. These men are desirous of increasing their financial income without any compensating outlay of professional knowledge.

One journal contains an article on malocclusion and various appliances used by the head orthodontist of a certain dental laboratory. We do not know who the writer of this article is, but we can only say that he is by no means bashful or afraid to accept credit for what his laboratory can do. He seems to have a particular grievance against specialists when he states: "All these various forms of practice were worked out by a specialist, and in my humble opinion, therein lies the trouble. All these theories have their qualities and indications and will be the instruments of success if properly applied and used for the right cases.

"But the only type of establishment that is able to judge where a certain kind of appliance is indicated, is the large, and fully equipped dental laboratory. Its unique advantage lies in the fact that it constructs appliances of all varieties of such cases, and the word 'Difficult' has no meaning for it."

The writer uses the names of men who are prominent in the orthodontic profession, which would indicate that he has at least acquired a little knowledge either by reading or by conversation with others. However, he gives credit for certain appliances, combinations and systems to men who never knew they possessed or designed the system. He also gives a treatise on "Causes of Malocclusion," which makes it very easy for one to recognize the etiology of the malocclusion they are going to treat. His advice in the beginning of the treatment of a case of malocclusion is to obtain "a set of modeling compound impressions to be used as study models." "These should be carefully gone over, and a method of procedure planned. Send the impressions or models to this laboratory for advice and consultation." Some of the illustrations used in this article have a very similar appearance to those which have been published in standard text books and journals. It is possible that two cases may be found which are exactly alike, but it is the first time in our experience that we have seen two cases of malocclusion with the same type of appliance published in different journals, one not bearing any relation to the other. It would be very interesting to have this particular laboratory explain why some of these illustrations are so strikingly similar to those which have been published in journals and text books.

The unfortunate thing about orthodontic information as it is "broadcast" by dental laboratories is the misleading statement in regard to the ease with which work can be accomplished, if the appliances are made in these laboratories. The longer one practices orthodontics the more he is convinced of the fact that it is impossible to plan a regulating appliance that is going to be satisfactory from the beginning to the end. Even if such an appliance were designed, it would depend upon the ability of the operator to adjust and manipulate it in order to obtain a satisfactory result. Appliances must be used; but the appliances must be used by men who are capable of manipulating them, and the construction of an appliance by a laboratory is not going to produce a successful treatment of malocclusion any more than it is possible for one not familiar with aviation to successfully fly an aeroplane, although the aeroplane is properly constructed. Because

a piano manufacturer can make a fine instrument is no sign that any one who so desires can successfully perform on that instrument. The successful correction of malocclusion depends upon the knowledge of the operator more than it does upon the construction of the appliance. Misleading statements published by dental laboratories, regardless of how efficient the appliance may be, are only going to get the dentist into trouble unless he is able to manipulate the appliance after it is manufactured. The unfortunate thing about dental laboratories is that they make the appliance for you but do not give you the ability to operate it. We have often wondered whether the dental laboratories were a benefit to the profession, and to the public, but when we read these advertisements and articles issued by commercial laboratories, we are inclined to believe that the public and the profession would be much better off if dental laboratories did not exist. It will be with interest that we shall watch the ultimate outcome of the advent of dental laboratories into orthodontics.

COMMUNICATION

October 12, 1923.

International Journal of Orthodontia,
St. Louis, Mo.

Dear Sirs:

In the September number of your journal there appears a report of a case treated by the students of Harvard Dental School under the supervision of Dr. Fred R. Blumenthal, and reported by him at the last meeting of the American Society of Orthodontists.

In his report he states that the case was a Class III (Angle classification), and apparently his only reason for so diagnosing it is what he chooses to call "a marked mandibular prognathism."

Dr. Angle, in his seventh edition of *Malocclusion of the Teeth*, says this: "These classes are based on the mesio-distal relations of the teeth, dental arches and jaws, which depend primarily upon the positions mesio-distally assumed by the first permanent molars on their erupting and locking." Again he says: "Class III, Division 1, is characterized by mesial occlusion in both lateral halves of the dental arches. The extent to which the mesial occlusion must exist in order to place the case in the division of this class is slightly more than one-half the width of a single cusp on each side * * *."

In the case under discussion, I must take issue with Dr. Blumenthal in that he has a Class I case with an atypical Class III condition, and not a Class III case as he states. In Fig. 1, lower right, there is one bicuspid in position, and immediately posterior to this is a second deciduous molar, which in Fig. 3 shows its space occupied by the second bicuspid. The first permanent molars in Fig. 1 are in normal mesio-distal occlusion, unless this

lower molar of which I spoke is the first permanent, which I think it is not. The apparent prognathism is not a typical one such as we find in all Class III cases, but is caused by a posterior displacement of all the teeth on the maxillae anterior to the impacted bicuspid as evidenced by his radiograms.

The result is a very good one, and Dr. Blumenthal has every reason to be proud of it and the work of his students, but I do not believe that the treatment instituted was that used in Class III cases. If this were so they would have had to move the upper first permanent molars distally to produce a mesial occlusion. What was really accomplished, as evidenced by the models of the treated case, was an anterior movement of all the maxillary teeth mesial to the impacted bicuspid. This movement corrected the apparent or atypical prognathism. There is no evidence that the mandible was moved distally, for had this been done a Class II, Division 1, condition would have been the result.

The science of orthodontia is making rapid advances today, and in order to make these advances we are all seeking for new truths to add to our fund of organized knowledge. But, unless we are more careful in accepting reports such as the one under discussion without due censorship, we will subtract rather than add to the science of orthodontia. When case reports are read at society meetings they are usually given in a hurried manner, and no one seems to care whether they are scientifically correct or not. Could any one imagine a surgeon appearing before a scientific body of men and reporting a case where there exists say a large growth on the neck, and merely say that this growth was a carcinoma as evidenced by the marked swelling in the thyroid region? No, not one of you can, and yet such was the case right in the midst of a large meeting of our National Society. It was not only accepted in open meeting, but was allowed to be published without an iota of censorship. I care not whether a case be treated by students or practitioners, but when a presentation is made before a body of scientific men, it should be discussed fully, and not allowed to be published until censored by an efficient committee, which committee should be composed of the most representative men who should hold office for life. If mistakes are made in diagnosis, either wittingly or unwittingly, they must be corrected before they reach the publisher's hands. Contributions such as the one heretofore referred to have no place in the archives of orthodontia, for those archives are sacred, and must be guarded with jealousy. Let us not tear down the work of those men who have given of time, brains and money to place orthodontia in the category of the higher sciences.

I would be glad to have Dr. Blumenthal answer this criticism through the pages of your journal, and if he can convince me that I am wrong, I will meekly bow to him in acquiescence. If I am correct, then I think that he should, through the pages of your journal, retract his diagnosis.

Yours in the interest of science,

SAMUEL J. LEWIS.

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